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^{1,2}Khapugin A.A., ¹Silaeva T.B.

**ABOUT DISTRIBUTION OF GENUS *ROSA* L.
IN THE MOKSHA RIVER BASIN**

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The features of distribution of the genus Rosa L. (Rosaceae) in the Moksha River basin are presented. Factors spread of roses in the area of research are analyzed.

Keywords: Rosa, Rosaceae, river basin, the Moksha River, habitat.

Introduction

The Moksha River is right tributary of the Oka River. Moksha River basin covers an area of 51,000 square kilometers. It covers the western part of the Republic of Mordovia, the north-west – of Penza oblast, eastern parts of the Tambov and Ryazan oblasts, south-west part of the Nizhniy Novgorod oblast. Feature of Moksha River basin is that the rivers in southern part start of the sublime steppe and forest-steppe landscapes of Volga Upland; but mostly they flow in the forest, sometime very swampy, water-glacial plain of the Oka-Don Lowland [1].

Roses – wild and cultivated shrubs, which are widely used as medical, ornamental plants, as source of vitamins.

Material and methods

Adapting to environmental conditions, as to natural and to the changing under humans influence, they occupy a wide variety of habitats. Cultivated species often become naturalized. We have attempted to identify the main types of habitats, occupied by roses in the Moksha River basin. All habitats are grouped into 8 basic types at result of analysis of well-known finding of roses.

1) Transport links, which include roadsides of dirt roads, railways, highways. 2) Human settlements (entire town and its immediate neighborhood). 3) Slopes (gullies, ravines and river valleys, grasslands and steppe). 4) Shelterbelts. 5) Meadows

(floodplain and upland). 6) Forests (including the edges of forest and clearing). 7) Abandoned gardens (outside settlements). 8) Fallow lands (including field margins, arable lands).

Results & Discussion

As a result of research in flora of the Moksha River basin is identified 17 species from the 4 sections of genus *Rosa* L. – *Rugosae* Chrshan., *Rosa* (= *Cinnamomeae* DC.), *Caninae* L. (subsections *Caninae* Christ, *Vestitae* Christ, *Rubiginosae* Crep.), *Pimpinellifoliae* DC. Some specimens combine morphological characteristics of several species of roses, so they can not be attributed to any particular species. These morphotypes of hybrid origin are grouped in the separate taxon, and are regarded as a taxon *Rosa canina sensu lato* (s. l.).

Species diversity of selected habitats group in the Moksha River basin varies from 4 to 13 (Table 1). The largest number of species is founded on roadsides of transport links, which are migration corridors for them. The considerable number of roses are registered in the meadows and slopes (10 and 9 species, respectively). These are the most natural habitat for many species of roses in the area of research.

Table 1

Occurrence of species of genus *Rosa* L. (*Rosaceae*) in different types of habitat in the Moksha River basin

Species	Type of habitat								Total
	Transport links	Human settlements	Slopes	Shelterbelts	Meadows	Forests	Abandoned gardens	Fallow lands	
<i>R. caesia</i> Sm.	+								1
<i>R. canina</i> L. s. str.	+	+	+	+	+				5
<i>R. canina</i> s.l.	+	+	+	+	+		+	+	7
<i>R. caryophyllacea</i> Bess.	+					+			2
<i>R. cinnamomea</i> L.	+	+	+	+	+	+	+	+	8
<i>R. corymbifera</i> Borkh.	+	+	+		+				4
<i>R. dumalis</i> Bechst.	+					+	+		3
<i>R. glabrifolia</i> C.A. Mey. ex Rupr.	+	+	+	+	+	+	+		7
<i>R. gorenkensis</i> Bess.					+	+			2
<i>R. lupulina</i> Dubovik	+		+		+		+	+	5

<i>R. podolica</i> Tratt.					+				1
<i>R. rubiginosa</i> L.				+	+	+			3
<i>R. rugosa</i> Thunb.		+							1
<i>R. spinosissima</i> L.		+							1
<i>R. subafzeliana</i> Chrshan.	+								1
<i>R. subcanina</i> (Christ) Dalla Torre et Sarnth.	+		+		+		+	+	5
<i>R. uncinella</i> Bess.	+		+						2
<i>R. villosa</i> L.	+	+	+				+		4
Total	13	8	9	5	10	6	7	4	

A large number of findings of roses is concentrated around the old homestead and abandoned gardens (so-called «Barskiy sad» [manor gardens]), holiday villages, large settlements. For example, Nikol'skiy sad [garden near the Nikol'skoe village] (Torbevskiy district of Republic of Mordovia), Kazno Pando (Kadoshkinskiy district of Republic of Mordovia) [2], the village Ushinka (Zemetchinskiy district of Penza oblast), abandoned garden near the «Barskiy prud» [The pond near the Beketovka village] (Issinskiy district of Penza oblast). The presence of these cultivation centers and subsequent dispersion of roses is one of factors of their distribution in the Moksha River basin.

Conclusion

In the flora of the Moksha River basin identified 17 species of roses from the 4 sections of genus *Rosa* L. The largest number of species of the genus is found on roadsides of transport links, which are migration corridors for them. The considerable number of roses are registered in the meadows and slopes (10 and 9 species, respectively). Locations of previous culture of roses – an abandoned mansions, old gardens, etc. – play significant role in their dispersion.

Acknowledgements

Irina O. Buzunova (BIN RAS, St. Petersburg) helped identified a significant part of the herbarium material of genus *Rosa* L.

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Koshevsky I.I., Patyka N.V., Berezhnyak M.F., Kanarsky E.R.

**EFFECT OF TILLAGE, MANURE AND FERTILIZERS ON THE
DEVELOPMENT OF MILDEW OF PEA**

National University of Life and Environmental Sciences of Ukraine

This work examines the impact of tillage, manure and fertilizers on the development of mildew of pea.

Keywords: downy mildew, the system of tillage, manure, fertilizers, peas, crop rotation

In studies conducted at village Stayki of the Kiev region we have established that the method of processing soil, manure under predecessors nickname and fertilizers have tons of great influence on the development of downy mildew of pea (Table 1).

Thus, in the embodiment where the dumping was carried out under the predecessor of Sun Pasha (sugar beet Naja) and the introduction of 40 tons of manure, fertilizers N₆₀ P₆₀ K₆₀ the number of races teny affected peronosporosis was lower than in the processing of flat fields subsurface instrument (a fine tillage) 11,6 – 31,8%, and progression of the disease – by 12,5%. With level of lesion Pea in the blade instrument peronosporosis tillage was less than subsurface 12.5%, with

moldboard- hand (moldboard – a predecessor) – at 9,9%. These variations in low lesion beans (0,03-0,04 %) there were no lesions of pea seeds.

Increasing the dose of fertilizer 2 times (N₁₂₀ P₁₂₀ K₁₂₀) reduced the number of suppressive soil and contributed to increasing infestation of pea downy mildew in the moldboard tillage.

Table 1

Effect of tillage methods, doses of fertilizers and manure on the development of mildew of pea (v. Stayki, Kyiv region)

Method of soil treatment	Contributed manure – 40 t/ha							
	N ₆₀ P ₆₀ K ₆₀ kg/ha				N ₁₂₀ P ₁₂₀ K ₁₂₀ kg/ha			
	Injured plants, %	Disease development, %	Injured beans, %	Injured seeds, %	Injured plants, %	Disease development, %	Injured beans, %	Injured seeds, %
Moldboard at 23-25cm	68,2	18,3	0,03	0	80,0	32,6	0,06	0,01
Moldboard – hand 23-25 cm	76,5	20,9	0,04	0	92,0	34,8	0,06	0,01
Subsurface deep by 23 – 25 cm	88,4	28,0	0,07	0,01	96,5	37,6	0,09	0,03
Subsurface fine for 10 – 12 cm	100	30,8	0,24	0,03	100	43,2	0,3	0,05
NSR ₀₅	2,4		1,5		3,1	1,6		

The productivity of peas in the manure and different doses of fertilizers and methods of processing soil varies (table 2). In the version with the introduction of a single dose of manure and fertilizer (N₆₀ P₆₀ K₆₀) for moldboard and moldboard plowing hand, compared with hand number of grains per plant was greater at 2,8-5,0 pc., weight of grains per plant – 1,6-1,8 g, weight of 1000 seeds – 22-26 g, and yield – 0,33-0,61 t/ha.

Table 2

Effect of tillage methods, single-rate fertilizer and to make the cart on the productivity of pea (manure – 40 t/ha, N₆₀ P₆₀ K₆₀ kg/ha)

Variant	The number of pods per plant, pieces	The number of grains per plant, pieces	Weight of grains per plant, the	Weight of 1000 grains, the	Harvest particular, t/ha
Moldboard 23-25 cm	3,5	16,6	3,8	236	3,86
Moldboard-hand 23-25 cm	3,5	14,4	2,9	232	3,58
Subsurface deep by 23-25 cm	3,2	12,3	2,6	216	3,32
Subsurface fine for 10-12 cm	2,8	11,6	2,0	210	3,25

NDS₀₅ – 0,14 t/ha – 0,17 t/ha

Making a double dose of fertilizer for miner Alno moldboard and moldboard-hand tillage compared with subsurface helped increase the number of grains per plant (table 3).

Table 3

Effect of tillage methods, a double dose of fertilizer and to make the cart on the productivity of pea (manure – 40t/ga, N₁₂₀ P₁₂₀ K₁₂₀ kg/ha)

Option Experience	The number of pods per plant, pieces	The number of grains per plant, pieces	Weight of grains per plant	Weight of 1000 grains	Yield, t/ha
Moldboard at 23-25 cm	3,8	17,3	3,9	240	4,12
Moldboard-hand 23-25 cm	3,6	14,7	3,7	235	3,74
Subsurface deep by 23-25 cm	3,3	12,8	3,4	218	3,52
Subsurface small 10 – 12 cm	2,8	12,2	3,3	215	3,40

NDS₀₅ – 0,13 t/ha – 0,14 t/ha

Thus, the organic and mineral fertilizers in agrocoenosis when clamped into the soil and perform environmental regulatory role in relation to plants and pathogens to microbial cenoses.

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Vlasova SV, Nifontova OL, Sokolovskaya LV

**INDIVIDUAL-TYOLOGICAL FEATURES OF STUDENTS IN VIEW OF
THE CONSTITUTIONAL SOMATOTIPOLOGII**

Surgut State Pedagogical University

This article discusses the nature of constitutionally-typological differences in the study of patterns and types of forming constitutions for students. Techniques for determining the types of constitutions that are used in studies of modern domestic scientists. The interrelation between the type of hemodynamics and the type of adaptive response in individuals with different constitution.

Keywords: Physical development, the type of constitution, constitutional symptoms, constitutionally-typological differences.

Improving the physical development of the university places high demands on the study of patterns of an individual organism's development, constitutional somatotipologii, which determines the rate of development of the organism and, based on the development of specific science-based regulations for organizing and conducting training sessions in higher education, which is especially important for girls. Physical education of girls should be improved with the general biological mechanisms, and future reproductive functions of the body, their individual capacities and abilities, features of interest to the motivation of physical education.

Considering the types of constitutions students, it should be noted that in studying the laws of their formation is necessary to understand the essence of constitutional-typological differences. The basis of diagnosis types of constitutions is the conventional approach, which is characterized by the separation among the many

individual variations are common to these types of body structure, the characteristics of reactions to external stimuli. The latter is important for assessing the quality indicators reactivity [1, 10].

Currently there are no clearly identified constitutional symptoms, which are objectively and fairly assessed to typological features of the organism. Most of today's local researchers to determine the types of constitutions follow procedures VG Shtefko and AD Ostrovsky modified SS Darskoy [3]. In the diagnosis of constitutional types are used somatoskopicheskie and anthropometric criteria to define the boundaries between the different variants [12, 10].

One of the most important aspects in the diagnosis of types of constitutions is the comparability of results obtained by different scientists. Many constitutional scholars believe the structural, functional and behavioral characteristics that are stable over a long period of time. With age, changes may occur in the ratio of the different constitutional types [7, 8]. Conversions due to the constitutions of intense environmental exposures. Intense exercise leads to changes in body proportions, and the neuroendocrine regulatory mechanisms in the human body [10].

There are legitimate age, gender, regional differences in the distribution of types of constitutions. [9] It is established that there is a certain pattern of change in the formation of constitutional types associated with the processes of acceleration and retardation [6]. The current population of students with significant differences in somatic and functional traits of a particular type of constitution. Anthropogenic influence of the environment, socio-economic conditions, lack of exercise, stress overload is individual variability and leads to considerable variability in the formation of a type of constitution [6].

A. Kliorin et al. [5], BA Nikityuk [9] to describe the normative constitutional types highlight the fact that individuals degressive constitution of a well-developed lower third of the face, with divergent branches of the lower jaw and face shape of a truncated pyramid, a short neck. They have a well defined short and wide thorax, abdomen well developed, pronounced folds of fat, dull corner of the hypogastric. Students have the muscle of the Constitution square and round face, the body is

uniformly developed, hypogastric average angle, the shoulders are wide and tall, chest is of medium length, sharply defined contour of the muscles. In individuals with thoracic type of constitution is well-developed chest, defined a small stomach, they are characterized by a large lung capacity and development of those parts of the persons who are directly involved in breathing. Representatives of the Constitution of the asteroid are thin and delicate bone structure, with the predominant development of the lower limbs, narrow chest, a sharp angle hypogastric, underdeveloped stomach. Part of the students on a set of symptoms does not apply to any of these constitutional types, so they are included in the number of persons with undetermined constitution [5, 9].

It is noted that the longest period of increase in total body size observed by representatives of the asteroid type of constitution [10]. Much earlier, this process is completed at the students who have digestive and muscular constitutions.

BA Nikityuk [9] by studying the peculiarities of metabolism in girls of different types of constitutions revealed significant hypercholesterolemia in subjects such as digestive. The highest metabolic rate is set in a group of students of the constitution of muscle.

O. Dyadenko [4] identified a relationship between the type of hemodynamics and the type of adaptive response in individuals with different constitution. The author noted that for stayers is characterized by hypokinetic hemodynamic types, and for the intermediate sprint - eukinetichesky. The patterns allowed to consider the type of hemodynamics of the constitution as a private in the hierarchy of views on the general constitution.

O. Vizgalovym [2] found a direct correlation relationship between anthropometric variables that characterize the development of the component body composition and physiological indices of external respiration and somato-typological affiliation.

Thus, the literature contains data on the relationship between constitutional type somatometric, biochemical, functional and psycho-physiological characteristics of the human body, so the relevance of the subject is not in doubt.

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Privalova A.G., Nifontova O. L., Bazeeva K.Yu., Hristoforov P. N.

**THE BIOINFORMATION ANALYSIS OF THE VITAMIN STATUS
IN THE ORGANISM RADICAL AND NEKORENNOGO OF
THE POPULATION OF UGRA**

Surgut state pedagogical university

Summary. In this work the mikronutriyentny status at children radical (hant) and not radical nationality was studied. With use of the system analysis authentic deviations of the content of vitamins antioxidants (And, E, C) depending on age are revealed.

Keywords: vitamins, microcells, mikronutriyentny status, children of a radical and not radical nationality, biochemical indicators.

In modern literature interest to studying of the substances which are not medicines, but necessary for maintenance at adequate level of exchange processes and a homeostasis essentially raised. Vitamins antioxidants belong to such substances first of all.

In this regard reserve capacities of an organism which provide to it viability in the adverse environment [1, 6] decrease. Today doesn't cause doubts that a leading factor on extent of negative impact on a children's and teenage organism is the

chronic shortcoming микронутриентов and other biologically active connections [2, 7]. It is connected as with low level of their consumption, transition to the refined, preserved and thermally processed food rich with carbohydrates and fats, poor vitamins and mineral substances, and a high expenditure of energy in the conditions of a chronic ecological stress [3, 8, 9].

The new techniques were used, allowing to receive big information in an assessment of degree of a harmony, and also objectively to estimate the mikronutriyentny status (vitamins: And, E, C) children of a radical and not radical nationality of Yugra. Let's present comparative results of data processing within the theory of chaos and synergetics which show success of the last approach. Researches of vitamins antioxidants A, E, C were carried out by means of a method of the analysis of dynamics of behavior of VSOCh in m-dimensional phase space of conditions (FPS) with use of the registered program.

We carried out the comparative system analysis of the biochemical status of boys of a radical and not radical nationality of 7-17 years (younger age – 7-10 years, middle age – 11-14 years, advanced age – 15-17 years).

In drawings 1-6 three-dimensional parallelepipeds in which settle down a quantity of points are presented. In our case it is coordinates on three measurements (biochemical indicators).

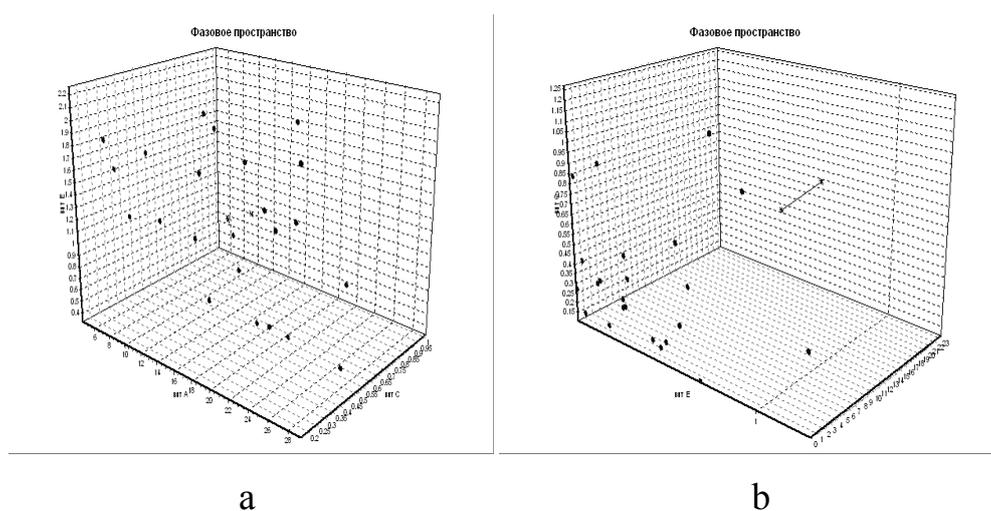


Fig. 1. Indicators of parameters of attractor of VSOCh in 3-хмерном phase space of conditions (vitamins A E, C) at children (boys of middle age). Here: and – boys-hanty; – boys of not indigenous people

Analysed parameters of attractor in multidimensional phase space showed that volume of attractor of the alien population (General V of value: 50.25) almost in one and a half time exceed that for indicators of children-hanty (General V of value: 39.82). Also rX value of boys of not radical nationality there are more than indicators of rX of children-hanty (2.99 and 0.17 respectively). quantity of points. In our case it is coordinates on three measurements (biochemical indicators).

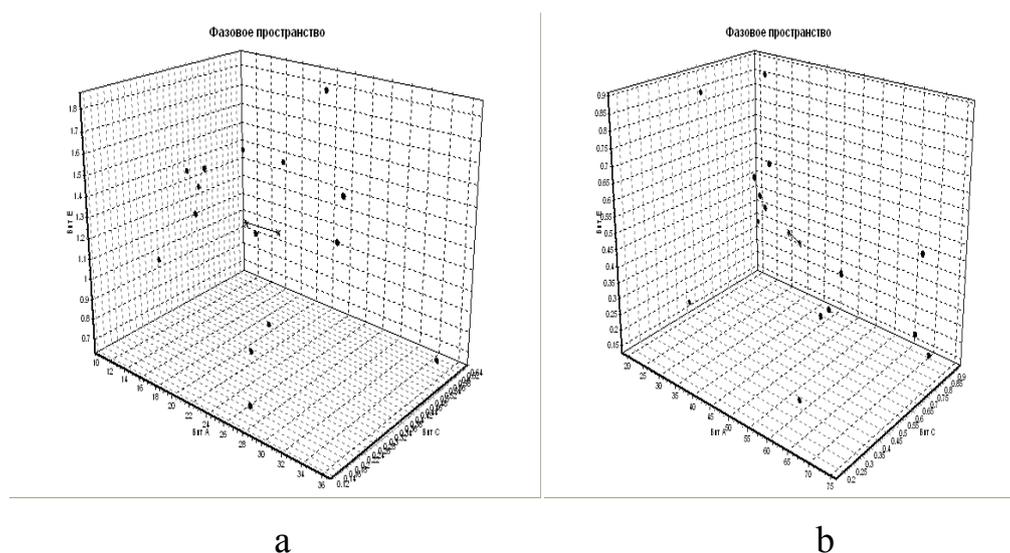


Fig. 3. Indicators of parameters of attractor of VSOCh in 3-хмерном phase space of conditions (vitamins A, E, C) at children (boys of middle age). Here: and – boys-hanty; – boys of not indigenous people

Volume of attractor of the alien population (General V of value: 33.9) considerably exceed that for indicators of vitamins antioxidants at children-hanty (General V of value: 16.9). RX values of basic distinction have no. In our case it is coordinates on three measurements (biochemical indicators).

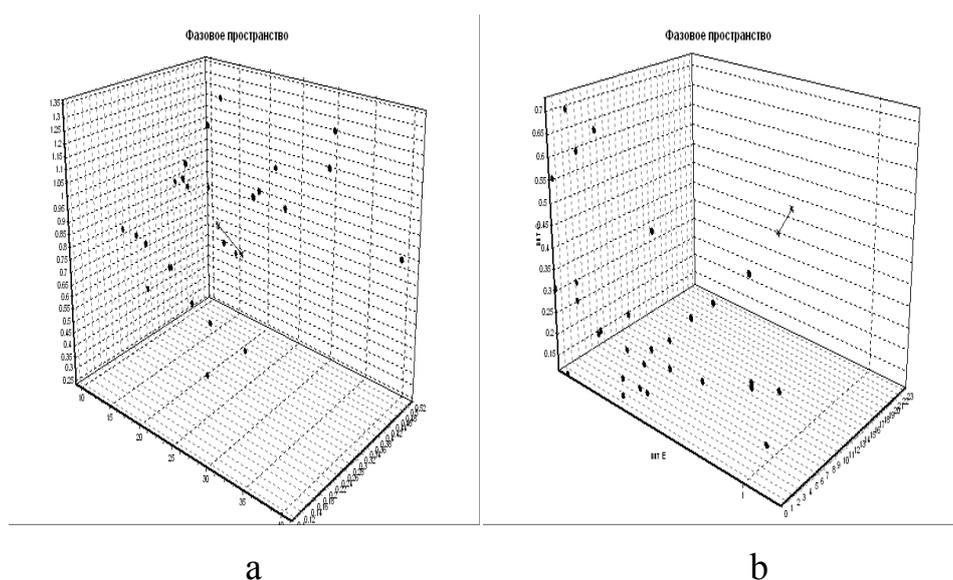


Fig. 5. Indicators of parameters of attractor of VSOCh in 3-хмерном phase space of conditions (vitamins A, E, C) at children (boys of advanced age). Here: and – boys-hanty; – boys of not indigenous people.

Results of processing in 3-хмерном phase space of parameters of an attractor for boys of advanced age (indicators: vitamins A, E, C) showed that volume of attractor of the alien population (General V of value: 28.33) exceed that for indicators of children-hanty (General V of value: 16.9). RX values of basic distinction in this case have no.

The analysis of parameters of attractor of a vector of a condition (VSOCh) of a human body in the 3rd measured phase space showed that the volume of attractor at all children on indicators of vitamins antioxidants decreased with age (from 39.82 till 14.95 – children-hanty and from 50.25 to the 28.33-alien population). On indicators of microcells at children-hanty of value with age increase (from 86.45 to 277.84), and at children of not radical nationality the highest volume of V_x was observed in the middle age and made 129.2.

As result, inhabitants of northern regions receive insufficient quantity of microcells that is shown by a wide circulation among the population of our region of their insufficiency with these or those clinical manifestations, characteristic for deficiency of these chemical elements with water and foodstuff.

The received results are a basis for development of scientific and reasonable constructive principles of creation of the balanced diets including adequate amount of vitamins antioxidants in a food of educational institutions.

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UDC 612.66

Chelnokov A.A.

**FUNCTIONAL FEATURES OF PRESYNAPTIC INHIBITION OF MUSCLES
OF A HIP IN HUMAN OF DIFFERENT AGES**

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Introduction. Currently, notions about age-specific peculiarities of excitation processes in various organs and systems of the human body have been formed [1,

10,15, 16, 13,12,7, etc.]. Inhibition processes taking place in various structures of the human central nervous system in the process of ontogenesis are less investigated. However, latest electroneuromyography methods make it possible to study various inhibition processes in the human segmental apparatus, which was reflected in neurophysiological researches [6, 9,4, 3, 2]. In this regard, the goal of our research was to study age-specific peculiarities of the afferent Ia provision of human skeletal muscles (using the example of m. rectus femoris).

Research methods and procedure. The experiment was conducted on 50 males, 9 to 27 years old (9-12 year-old boys, 14-15 and 17-18 year-old teenagers, and 22-27 year-old men). The method of assessment of the presynaptic inhibition (PI) of heteronymous Ia afferent fibers of m. soleus going from m. rectus femoris to the m. soleus α -motoneurons [6] consists in the measurement of m. soleus H-reflex facilitation caused by the conditioning stimulation of n. femoralis. During 0.5ms, no non-monosynaptic influences affect the facilitation of afferent flows through monosynaptic Ia fibers [6]. Under these conditions, the m. soleus H-reflex facilitation depends on the conditioning excitatory postsynaptic potential value. Therefore, the more the m. soleus H-reflex facilitation, the less the PI of the human skeletal muscle Ia afferent fibers.

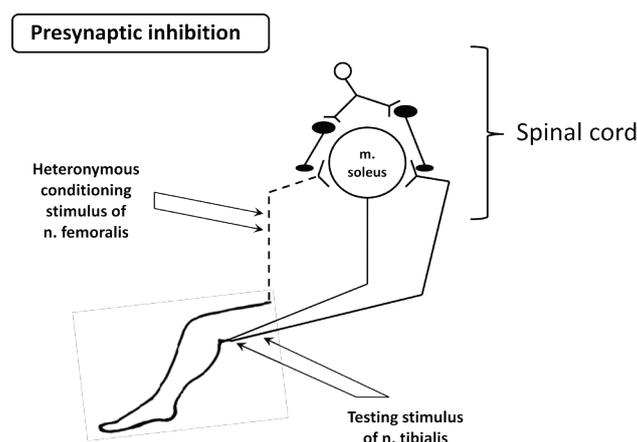


Figure 1. Method of determining presynaptic inhibition of heteronymous Ia fibers.

Notes:

- - m. soleus H-reflex path
- - - - - conditioning Ia flows from heteronymous n. femoralis

Surface electrodes were used for the stimulation of n. tibialis and n. femoralis. 1ms rectangular pulses from the Mini Electrostimulator were used as the stimuli. For surface EMG recording, pairs of non-polarizable disc electrodes with a diameter of 0.9cm were used. The electrodes were placed at the distal one third of m. soleus and the straight line of the head of m. rectus femoris, 1cm apart from each other.

The m. soleus H-reflex was invoked using the common method, by stimulating n. femoralis through a unipolar electrode, the active electrode being placed in the popliteal space. The stimulation of n. femoralis before the testing stimulus of n. tibialis was performed using unipolar electrodes. The active electrode was placed in trigonumfemorale (Fig. 1).

Under heteronymous conditioning stimulation, due to more proximal position of the electrodes used for the n. tibialis stimulation relative to the electrodes stimulating n. femoralis, the testing stimulus was applied before the conditioning stimulus. In this case, the interval between the conditioning stimulus and the testing stimulus had a negative value.

Results. As a result of the experiments, the most effective time intervals for recording the PI of the m. rectus femoris Ia afferent fibers between heteronymous conditioning stimulation of n. femoralis and a testing stimulus of n. tibialis in different age groups were revealed. For 9-12 year-old boys teenagers, the optimal delay values are -4,9 ms ($141,57 \pm 10,12\%$; W-test, $p < 0.01$); for 14-15 year-old teenagers, the optimal delay values are -5,3 ms ($119, \pm 6,67\%$; W-test, $p < 0.01$); for 17-18 year-old teenagers ($158,15 \pm 8,28\%$; W- test, $p < 0.01$) and 22-27 year-old men ($141,45 \pm 8,06\%$; W-test, $p < 0.01$), the optimal delay values are -5.9 ms (Fig. 2).

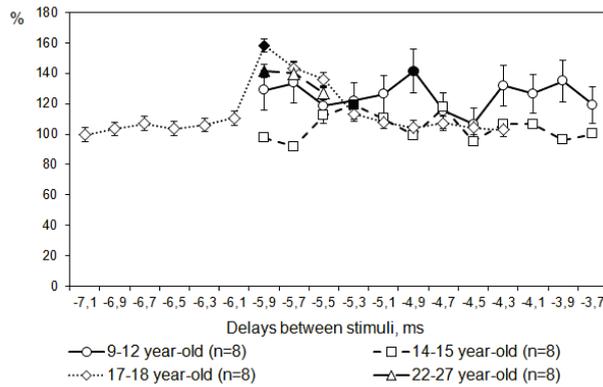


Fig. 2. Dynamics of heteronymous m. soleus H-reflex inhibition or facilitation in persons of different ages under heteronymous conditioning stimulation of n. femoralis, with different delays between stimuli, %.

The experimental research results have shown that 14-15 year-old teenagers demonstrate the maximum intensity of PI of the m. rectus femoris Ia afferent fibers as compared to 9-12 year-old boys ($F_{1, 28} = 7,523, P=0,010$), 17-18 year-old teenagers ($F_{1, 28} = 27,558, P=0,000$), and 22-27 year-old men ($F_{1, 28} = 9,281, P=0,005$). Under heteronymous conditioning stimulation of n. femoralis in 17-18 year-old teenagers, the PI of the m. rectus femoris Ia afferent fibers is less intense than in the other groups under study, which was expressed in higher m. soleus H-reflex facilitation in these persons being tested (Fig. 3).

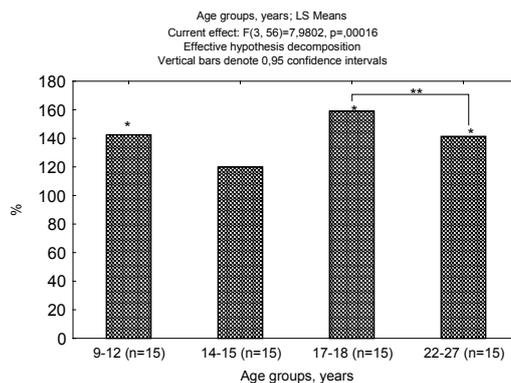


Fig. 3. Heteronymous m. soleus H-reflex facilitation in persons of different age groups under heteronymous conditioning stimulation of n. femoralis, with optimal delays between stimuli, %.

Discussion. Different human ontogenesis periods are described with different intensities of the presynaptic inhibition of m. rectus femoris Ia afferent fibers. Results of our researches demonstrate that the intensity of PI of the Ia fibers, in the relative

muscular rest condition, is higher in 14-15 year-old teenagers than in 9-12 year-old boys, 17-18 year-old teenagers and 22-27 year-old men. This can probably be explained by the fact that the afferent link development is still being finished during the teenage period, which is interrelated with the stabilization of many basic motion parameters and movement qualities during adolescence. It should also be noted that intracortical structural transformations of the brain are still taking place in 9-12 year-old children [17, 14, 5]. Different modulations of PI of the spinal motoneurons in 9-12 year-old children and 14-15 year-old teenagers may be due to supraspinal influences and probably depend on the degree of maturation of upper parts of the nervous system.

Under heteronymous conditioning stimulation of n. femoralis in 17-18 year-old teenagers, the PI of the m. rectus femoris Ia afferent fibers is less intense than in the other groups under study, which was expressed in higher m. soleus H-reflex facilitation in these persons being tested. These changes may be caused by heterochronous development of supraspinal structures in the human central nervous system. In the group of 22-27 year-old men, decrease of the heteronymous facilitation of monosynaptic m. soleus H-reflex was observed, which shows that PI of the m. rectus femoris Ia afferent fibers is more intense in this group. Our results agree with data obtained in the research by Morita et al. [11]. These data show that the heteronymous m. soleus H-reflex facilitation decreases with age and, as a result, the intensity of PI of the m. rectus femoris Ia afferent fibers increases. Similar results were obtained when the heteronymous facilitation of m. soleus H-reflex in the muscular rest condition and in the standing position in normal conditions in young and elderly people was compared [8].

In our opinion, the change of intensity of the presynaptic inhibition of the m. rectus femoris Ia afferent fibers under heteronymous conditioning electric stimulation, is caused by the development of reflectory functions of the neuromotor apparatus, which is associated with the level of the morphofunctional maturation of its links and their anatomic changes in the process of the human age-related development.

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G.K. Khodzhaeva

**GEOECOLOGICAL ANALYSIS OF OIL PIPELINES IMPACT ON
NIZHNEVARTOVSK REGION'S ENVIRONMENT**

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Western Siberia is a center for oil industry, which accounts for over 53% of initial reserves. Around half of the exploration area (55%) belongs to the licensed sites of oil production companies.

Transportation and export of oil is the foundation of the nation's economic stability. Modern civilization can be characterized by advanced underground lines of communication. Pipelines make up an essential part of such systems. Non-stop use of pipelines covers a period of 25-30 years. As the period draws to an end all the pipelines are to undergo preventive maintenance.

Pipeline damages are usually caused by corrosion and flaw growth in poor-quality pipelines, which have not been detected during pipeline testing. Degradation of insulation coating accelerates corrosion, especially in aggressive soils.

In a normal mode operation an oil pipeline has a minimal environment impact. Major negative effects occur as a result of pipeline accidents, with release of chemical and explosion materials under generation of high pressure. A technogenic emergency situation follows - air, water and soil contamination, damage of flora and fauna, harm to people living near accidents sites.

Geoecological situation on the territory of the Nizhnevartovsk region is considerably influenced by oil and gas producing industry. Oil and Gas complexes affect all ecosystem components: atmosphere, soil, vegetation, relief, surface and ground waters.

Human-induced changes in environment which cause structural and functional damage of naturalistic systems (landscapes) alongside negative social, economic and other outcomes are considered to be environmental problems.

An environmental problem according to B.I. Kochurov's studies can be defined based on changes in landscape character and measured by its intensity, spread area, type of effects. B.I. Kochurov identifies 3 levels of changes in natural properties (indicators of separate problems): 1 – weak, 2 – medium, 3 –strong.

Major natural environment components that are altered under the influence of pipeline transport in Nizhnevartovsk region are water, soil, flora and fauna.

In order to define environmentally-destructive areas in the Nizhnevartovsk region there has been conducted a research with examination of accidents and oil spills, zoning of premises within major oil enterprises.

The largest number of local significance emergencies occurred on the premises of “Tomskneft ltd” and “Vareganeftegaz ltd”.

In accordance with the results obtained after the examination of pipeline accidents and oil spills within the Nizhnevartovsk region the following areas have been identified:

1) Low-level contamination: the amount of oil spilled– up to 20 tons, coverage area – 20 000 m² – Vatinsky, Agansky, Megionsky, Ermakovsky, Khohryakovsky, Permyakovsky, Bakhilovsky pipelines;

2) Medium-sized level of contamination: the amount of oil spilled varies from 20 to 40 tons, coverage area – from 20 000 to 240 000 m²– Sovetsky, Strezhevskoy, Varegansky, Vahsky, Tyumensky, Severo-Varegansky, Nizhnevartovsky pipelines;

3) High-level contamination: the amount of oil spilled – over 40 tons, coverage area – over 240 000 m² – Samotlor pipeline.

The zoning was based on the average spatial-temporal and quantitative data – indexes of polluted areas and amounts of oil spilled within Nizhnevartovsk oil fields collected during the period between 2003 and 2010.

Considerable part of oil spills (up to 80 %) is localized on marshy water-logged soils and water surfaces of lakes and ditches.

Concentration of oil products in rivers and lakes of Samotlor licensed site (“TNK BP ltd”), by 44 times exceeds maximum permissible concentration for water

entities. Snowmelt also contains lots of oil derivatives. Water is polluted with ferrum, nitrogen compounds, phosphorous compounds and humic substances.

The main reasons behind such a great number of pipeline accidents in the region are the following: overuse of equipment, insufficient funding to conduct pipeline maintenance and repair works, degradation of active networks.

Distinctive environmental features of the examined area prove that the environment and related natural processes are prone to instability. Monotonous landscape, lithology and numerically insignificant plant species composition generally lead to low environmental resistance.

The present data analysis of the environment showed that oil and gas industry, pipeline networks in particular, has considerable impact on the environment. Oil contamination caused by oil pipeline accidents is of a critical concern in the Nizhnevartovsk region, a problem that needs comprehensive solution.

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UDC: 632.95.025.8

Vorontsov V.V., Kulagina K.V., Kamenek L.K., Korovina E.V.

**ASSESSMENT OF BIOLOGICAL PREPARATION "DELTA-2" TO
EARTHWORMS CONDITIONS OF ARTIFICIAL SOIL POLLUTION**

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The work studies the influence of biological pesticide conditionally named "Delta-2" based on the protein delta-endotoxin Bacillus thuringiensis to soil mesofauna on the representatives of the earthworms Lumbricus terrestris. Shows the results of studies of acute mortality and the impact of pollution on the reproductive performance of the substrate.

Key words: delta-endotoxin Bacillus thuringiensis, Lumbricus terrestris, reproductive performance.

Pesticides are biologically active substances, more or less adverse impact on the biota, including invertebrates fauna of agroecosystems and the representatives of soil

biota are important in soil-forming process [1]. Earthworms are actively involved in the process of recycling plant biomass and mineralization of organic matter, and they accumulate pesticides and other chemicals in amounts hundreds of times higher than their content in the soil [2]. This makes it a prerequisite for their use in ecotoxicological studies of the effects of pesticides on soil biota [4].

In scientific publications, almost no data on the comparative evaluation of the various classes of pesticides, including those of biogenic origin, on the worms. The urgency and insufficient knowledge of the matter was the prerequisite for this study. In a study of the biological agent was used, based on the delta-endotoxin of *B. thuringiensis subsp. kurstaki* strain Z-52, obtained from Culture Collection of Microorganisms Russian Institute of Plant Protection (WALS), Pushkin, Leningrad region [2].

Under laboratory conditions, were studied behavioral patterns and changes in the number of earthworms under the influence of biological pesticide, depending on the concentration and exposure time.

Studies were conducted on modified technique developed by standard techniques [3], taking into account the practical conclusions of the 2nd International Symposium on Earthworm Ecotoxicology [3].

Used in the experiments mature specimens of the earthworm *Lumbricus terrestris* from the mother population. In the first experiment, the worms have made a day after the preparation of the substrate with 10 individuals in a cell, contained in 7 days of air at $T = 20 \pm 2$ ° C. In the second - to 10 individuals per container, contained 28 days of air at $T = 20 \pm 2$ ° C.

As a control soil with no pollutants. Was recorded 93% survival rate of worms in 28 days. Thus, the initial substrate is consistent with the requirements of techniques [3] and was suitable for use in experiments. Significance of differences of control and experience determined by comparing the sample means and sample parts of t-test with $p < 0,05$.

Analysis of the biological preparation based on the protein delta-endotoxin *Bacillus thuringiensis* showed that the mortality of worms occurs only when the drug

concentration of 10 g / kg of soil on the sixth day of the study. It amounted to $0,4 \pm 0,1$ ind. in laboratory cell and was not statistically reliable. At concentrations of 0.01 to 1 g / kg of soil behavior of the worms remained the same as before the introduction of a pesticide in the soil (Table 1).

Table 1

Effect of insecticide "Delta-2" (based on the delta-endotoxin of *Bacillus thuringiensis*) on the mortality of the worms in the laboratory

The dose of application, g / kg	Mortality <i>Lumbricus terrestris</i> , the average of five ditches, ind..						
	1 day	2 day	3 day	4 day	5 day	6 day	7 day
50,0	0	0	0	0,8±0,2	0,8±0,2	0,8±0,2	1,4±0,2
10,0	0	0	0	0	0	0,4±0,1	0,4±0,1
1,0	0	0	0	0	0	0	0
0,1	0	0	0	0	0	0	0
0,01	0	0	0	0	0	0	0
Control	0	0	0	0	0	0	0

Note: * - the differences compared to controls significant at $p < 0,05$

When making the soil a maximum concentration of drug deaths worms came on the fourth day and was $0,8 \pm 0,2$ individuals in laboratory cell. By the seventh day of the experiment, mortality of earthworms increased to $1,4 \pm 0,2$ ind. on the cell, but was not statistically significant.

The reaction of worms within the first 10-30 minutes after addition of the drug "Delta 2" on the basis of the delta-endotoxin was similar in all animals in all analyzed concentrations. Behavioral responses were unchanged (before entering the drug). The number of worms assigned to this reaction, averaged 95%.

The test was conducted on the reproductive ability of the method of recording the reproductive performance of earthworms (EPS 1/RM/43, 2007). They were placed in a cuvette with contaminated soil under a parallel control for 28 days (EPS 1/RM/43, 2007). Weekly calculated the percentage of survivors, the cocoons were removed, placed for incubation in Petri dishes with the same substrate (sample of 10 grams per cup) on day 21 at $T_{air} = 23 \pm 2^{\circ} C$, humidity 80%. After 3 weeks of the contents of the cups tested, juveniles earthworms were displaced, their number was recorded. Entire cocoons were left in the cups for a further 7 days, after which the

procedure was repeated. Table 2 presents the results of the eight-week study of the reproductive capacity of worms in polluted substrate, and the results of studying the toxic effects of pollution on the substrate cocoons.

Table 2

The influence of pollution on the reproductive performance of the substrate earthworms

Type of contaminant in the substrate	Concentration of pollutant	The total number of cocoons	The number of cocoons laid by a worm of the week	The number of juveniles in a cocoon	% Of live cocoons of the total number of cocoons
Control		200±6,4	0,88±0,22	2,04±0,22	80,5±2,7
"Delta-2"	0,01 г/кг	190±5,0	0,89±0,27	2,01±0,24	70,5±2,6
	0,1 г/кг	192±4,6	0,98±0,32	1,88±0,24	70,0±2,5
	1,0 г/кг	180±4,2	0,80±0,20	1,88±0,22	68,4±2,2
	10 г/кг	164±3,8	0,75±0,22	1,60±0,20	60,3±2,2
	50 г/кг	136±5,8	0,50±0,32	1,0±0,18	30,3±2,0

Test for reproductive capacity showed that the drug at concentrations of 50 g / kg and 10 g / kg reduces the percentage of live cocoons of 55.3% and 28.5% respectively. For all shown in Table 2 Pollutant concentrations observed occurrence of juveniles from cocoons of worms, although the percentage of fertilized cocoons does not reach the control group.

So, we can conclude about the safety of the drug on the basis of insecticidal delta-endotoxin protein *Bacillus thuringiensis* to the representatives of mesofauna on the example of earthworms.

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**PHEROMONES MONITORING LYSTOKRUTOK GRAPES IN
TRANSCARPATHIA**

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*The article highlights aspects of the use of pheromones traps to protect the vineyards from the most common pests. Showing the use of pheromones traps in the protection of *Lobesia botrana* and *Eupoecilia ambiguella* on collective farms and individual farms in lowland areas of Transcarpathia. Stationary research on grape leaf held in the experimental farm of the Transcarpathian APV Institute village Muzhiyevo Beregovo district.*

Keywords: Pheromone trap, pheromone monitoring, environmental safety, vineyards leaf, the number of butterflies.

Condition of the problem. Among fruit plants grapes has a special place. Viticulture is an important sector of the economy of Ukraine. Transcarpathian region – the land of orchards, vineyards and berries, so monitoring populations of pests in perennial plantings is important. The problem of pest control in the modern period when the market was displaced from industrial relations in the collective, individual farmers and horticulture, viticulture. This area of agriculture of Ukraine has a specificity that significantly changes the strategy and tactics has developed protective measures with the use of pheromones, biological pesticides and plant.

A variety of essential and natural part of gardeners' plots, the difference in their growth and development and complexity of collective relief, farmers and individual

sites generally provide agrocoenosis that are high moving pests. An effective fight against them with minimal use of protective equipment can be made with the knowledge of the number of insects at each site even individual trees or shrubs. The optimal solution to this problem is observed in the use of pheromones traps are fairly and accurately reflect the number of local butterflies.

As a result of land reform in individual use in Transcarpathia increased more than fivefold. If in 1991 to homestead, cottages, gardens accounted for 3,8% of the Transcarpathian region of agricultural land, then in 1996 – 18,2 or 232,6 hectares. A similar pattern occurs in other regions of Europe. The process of spraying the ground continues. Therefore Pheromone monitoring in number of pests of perennial crops is important for signaling of terms dealing with them.

The purpose of the search has become an alternative to the use of pheromones traps and improve the environmental safety of plant protection of grapes from pests, such as: use of integrated crop protection of biological methods of protection against insect pests.

Methods of research. Experiments were established in the collective farms and individual farms in lowland areas of Transcarpathia – Berehovo, Vynohradiv, Mukachevo and Uzhgorod districts, and stationary studies on grape *Lobesia botrana* and *Eupoecilia ambiguella* at the experimental farm of the Transcarpathian Institute of APV biochemistry village Muzhiyevo Beregovo district, founded in 1985 a collection of grape varieties. Soil experiments on sod-podzolic-brownsoil. Area Power bushes 3,5 x 1,2 m rows are placed across the slope south-western slope of operation of 4°. Method of forming bushes by type border height 120 cm x rootstock Ripariya x Rupestris 101-14. Agriculture research in the area, conditions of pest and diseases generally, for research facilities. Area – 10 ha. Grape varieties include: table, table-technical, technical grades of white berries, technical grades of black berries.

The research results. In experiments were used triangular Pheromone traps "Ferotrap-IS" and Pheromone composition of the Institute of Biological Plant Protection Sciences of Moldova Chisinau. Pheromone traps hung out at the beginning of flowering vines. Accounting males caught in Pheromone traps were carried out to

the fly every day, or three days, and after registration beginning fly – seven days. The number of unrecorded grape bushes in 3-5 at each site. Each of them counted 100 sheets of 25 with four sides. Damage to fruit was determined by examination of a bush vines. The area of vineyards in the individual sector – 0,6 to 0,50 hectares.

As a result, research on pheromones for monitoring number *Lobesia botrana* (*Lobesia botrana* Den. Etsehoff) seen in (Fig. 1) that the number of clear allocation of four peaks that fell in May, June, July, August. A season of experimental collectible box of grapes caught 259 males per season. By season average of males were between 0 to 37 in the trap. But despite such a high number of males damage disrupted harvest grapes not seen, as evidenced by high insolation and air – the average daily temperature from 10 June to 12 August 2011 roku exceed 25-30 °C.

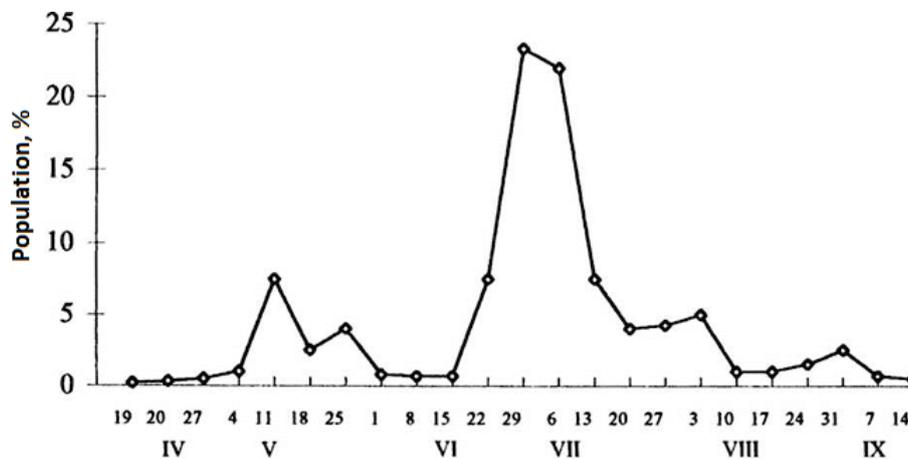


Fig. 1. Dynamics *Lobesia botrana* of Pheromone traps in individual sector. Horondy Mukachevo district, 2010

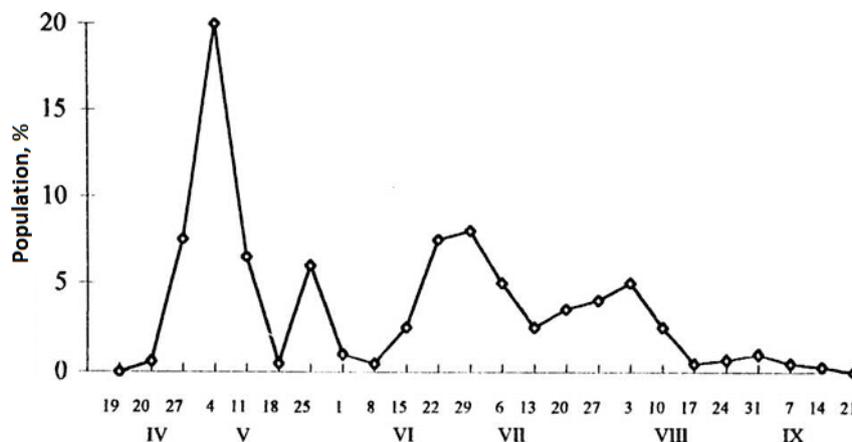


Fig. 2. Dynamics *Lobesia botrana* of Pheromone Traps individual sector. Horondy Mukachevo district, in 2011

Catching males *Lobesia botrana* and *Eupoecilia ambiguella* pheromones paste in the private sector also showed (table 1) a high number *Lobesia botrana*. Every two leaf no economic significance because of the small holdings area 97% of the area are hybrid grapes, Isabella, Zayber, gold-Dond, Noah and others.

Table 1**Pheromone traps capture males in the private sector of Transcarpathia**

Spot of research	Species	
	<i>Lobesia botrana</i>	<i>Eupoecilia ambiguella</i>
v. V. Bacta	664	112
v. Muzhiyev	778	378
v. Horonda	600	395
v. Onokivtsi	248	12

Thus, every two leafs and vine grapes had no economic value in the years 2010 - 2011 in Transcarpathia, although in some years leaf gives spa rags massive damage to European grape varieties. Thus, in 2010 in Uzhgorod and Vynohradiv areas of vineyards (piedmont area of cultivation) are not seen even on the fly males to pheromone traps. Chemical treatments were not performed.

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