16,0±1,15 μg/100 ml. Difference between experimental and control groups at the end of the experiment increased by 28.9% ($p<0,05$) and was (159±1,15 mg/100 ml).

One of the most important scientific and practical problems of modern poultry farming is the issue of vitamin and mineral supply of poultry. Microcells are vital substances, which act mainly as catalysts of many enzyme and hormonal systems, and they interact closely with vitamins. However, in the literature there is a small amount of information on the physiological effect of some microelements in the body of the bird for the different supply of its fat-soluble vitamins. Cuprum, zinc and manganese are essential elements for the development and growth of chicken broilers. Due to zinc deficiency, there are dermatitis, lack of appetite, diarrhea, growth retardation, visual impairment and limb defects, and occurs a shortage of manganese. Absorption of zinc in the small intestine is inhibited by vitamin A deficiency. For normal zinc metabolism, constant intake of vitamins A, C, $B_1$ and $B_C$ is required. However, manganese directly does not affect the level of fat-soluble vitamins, its action indirectly affects the activity of SE-dependent enzymes, which is closely related to the exchange of zinc. Combined with iron, copper and cobalt, manganese is involved in tissue respiration, has an effect on the metabolism of carbohydrates and increases the effectiveness of vitamins C and $B_1$. It should also be noted that vitamin D is associated with improved absorption of important elements such as iron, zinc and copper. The research has established a close interaction between trace elements and vitamins, which provides a dynamic equilibrium between them.

Today, the veterinary market is closely linked to the market for human medicine, and together they form the pharmaceutical market. In 2017, the Ukrainian veterinary pharmaceutical industry has mastered modern technologies for obtaining competitive medicines and their research and production testing and registration. It is suggested to use new forms of micro and macro elements, vitamins and vitamin-like substances, probiotics, complex carbohydrates, acidifying and preservatives of feed, preparations that improve digestion and absorb nutrients (enzymes, phytoextracts, essential oils, etc.). High prophylactic efficacy was proved by the presentation of the drug – Decavit, which reduced the number of broilers with signs of perorus . The efficiency of the use of chelating compounds of cuprum and zinc with methionine, lysine and glycine, as well as Zn-Nano-Methionine and Zn-Nano-Max, have been shown to have a positive effect on the exchange of zinc in chicken broilers. The use of vitamin-mineral preparation "BTF plus" for broiler chickens stimulates metabolic processes in the chicken body, and promotes more intensive growth and development of young birds. Drugs Carnivate and Introvit ES100 improve the metabolism of chicken broilers. Adding the phytase enzyme positively affects the assimilation of trace elements in poultry. For the supplementation of the bird organism with mineral substances and trace elements, a feed supplement of Miafos, which contains phosphorus, calcium, magnesium, sodium, copper, manganese, zinc, cobalt and high-quality emulsifiers, can be used.

Trace elements with high biological activity because of lack of nutrition can cause structural and functional changes in animals, and their excess has toxic effects. Thus, homeostasis of trace elements is an integral part of the metabolism of the body as a whole. Metabolism of one or more minerals causes metabolic disorders primarily protein, lipid and vitamin and mineral metabolism. This entails a very heavy and irreversible changes in bone, liver, endocrine system, which usually reduces the productivity of animals and completed their culling.

**Key words:** broiler chickens, Alphabet for animals, iron, zinc, manganese, copper, copper.

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## SEASONAL DYNAMICS OF CHRONIC ENDOMETRITISES SPREAD AMONG THE LIVESTOCK OF COWS OF DIFFERENT REGIONS OF UKRAINE

Подано аналіз результатів комплексного сезонного гінекологічного обстеження корів шести молочних підприємств, розташованих в Полтавській і Донецькій областях. Достовірно встановлено підвищення захворюваності корів на хронічний ендометрит в холодний сезон в середньому на 17,46 % (серед 1350 обстежених корів), причому відмічено істотне коливання росту рівня метропатій в різних стадах: від 5,78 до 46,99 %. Достовірно встановлено негативний вплив на захворюваність хронічним ендометритом розташування промислового комплексу в екологічно забрудненому регіоні за постійного утримання корів у закритих приміщеннях (діагностовано 82,81-91,16 % метропатій в теплий сезон і 93,20-96,94 % в холодний, відповідно). Не виявлено прямої кореляції між рівнем молочної продуктивності та захворюваністю на хронічні ендометрити корів, що свідчило за превалювання тиску на репродуктивне здоров'я тварин екологічних та технологічних факторів.

**Ключові слова**: лактуючі корови, хронічний ендометрит, субклінічні метропатії, сезонність, еко-кліматичний фактор, промисловий комплекс, відтворення.

**Statement of a problem.** Owing to transition of dairy branch to an industrial basis with high concentration of a livestock on unit of floor space, the intensity of exploitation of cows has significantly

increased. Considering need of considerable investments into design, construction and functioning of modern dairy complexes, decrease in terms of production use of cows in connection with premature leaving very negatively is reflected in economy of branch. It is well-known that different forms of infertility among which symptomatic takes the leading place are the most frequent reason of rejection of highly productive cows. Effective techniques of diagnostics and prevention of the endometritises provoking development of chronic infertility are demanded in the conditions of modern industrial production of milk.

**Analysis of the last researches and publications.** The review of domestic and foreign literature shows that inflammatory processes in uterus tissues, first of all – in endometrium, which develop as a result of penetration into opportunistic micro flora in both the exogenous, and endogenous way [3, 4, 6, 12, 13, 24] are considered as the main reasons for symptomatic infertility of dairy cows. The reasons leading to chronic pathologies in bodies of reproduction of cows are considered as an essential etiological component in the difficult mechanism of development of long and/or irreversible infertility [5, 6, 23]. According to different sources pathological changes in tissues of a uterus can have extremely polymorphic character: from a hyperplasia to an atrophy that significantly complicates diagnostics and adequate tactics of therapy.

These researches of cows of different dairy breeds in domestic and foreign sources showed unequal incidences of an endometritis (from 11 to 80%), but falling of economic indicators is always noted [2, 4, 11, 13, 22]. In the countries with the developed cattle breeding researches on studying of the reasons of infertility and methods of correction of reproductive function of cows constantly are financed, nevertheless, the offered options of treatment are often contradictory, and the statistics shows a tendency to decrease in reproductive health of uterine number of cattle [6, 9, 10, 12, 14, 17].

Symptomatic, especially chronic, infertility of the lactating cows is characterized by complex symptom complexes' on which forecast a number of the interfaced para typical factors of technological, economic and seasonal nature have significant effect that demands the detailed studying for development of adequate measures of prevention of incidence of cows of endometritises

Studying of seasonality of spread of chronic endometritises among dairy livestock of the industrial farms located in different regions of Ukraine was the purpose of our research. The goal has been executed step by step by a solution of the following tasks:

- selection of the region, survey of herd and performing complex gynecologic diagnostics of cows in several dairy enterprises of Ukraine;
- carrying out artificial insemination of clinically healthy cows (who have completed a course of gynecologic rehabilitation) with the subsequent control of effectiveness of fertilization;
- the analysis of the generalized data on the frequency of incidence of a chronic endometritis depending on a number of variable factors; level of an pregnancy of cows.

**Materials and methods of a research**. An experimental part of work has been carried out by us for 2010-2015 in six dairy enterprises of industrial type located in two areas with different climatic characteristics (tab. 1).

Table 1 **– The Short characteristic of the surveyed dairy enterprises**

| * | The name of economy, Region | The Breed of cattle | Efficiency area on herd, milk kg for a lactation the milk livestock | Herd, animals |
|---|---|---|---|---|
| 1 | LLC "Zorya", Donetsk | Red steppe | 4300 | 115 |
| 2 | LLC "Springs", Donetsk «Родник», | Ukrainian black-and-white dairy | 4200 | 300 |
| 3 | PR Bogoyavlensky, Donetsk | Ukrainian black-and-white dairy | 5900 | 600 |
| 4 | AF Agroekologiya, farm No. 5, Poltava | Ukrainian red motley dairy | 7000 | 550 |
| 5 | AF Agroekologiya, farm No. 4, Poltava | Ukrainian red motley dairy | 4500 | 350 |
| 6 | DP DG "Of Decembrists", Poltava | Ayrshir | 6000 | 500 |

**Note**: * – the specified numbering is used further in the text, all tables and charts.

According to the methodical approach (tab. 2) developed by us, we have conducted a complex gynecologic research of 1350 cows with the period of lactation more than 60 days and on a complex of symptoms have revealed among them animals with a chronic endometritis. An identification technique we based on the recommendations published in domestic and foreign sources [8, 9, 10, 12, 15], with

use of own modifications presented in the previous publications [4, 5, 16, 18, 19]. We have considered a row additional the morph functional / the pathology morphological of signs of a condition of tissues of uterus of cows together with the anamnesis of the postnatal period, and also indicator parameters of reproduction of herd in general that characterized innovative approach to diagnostics, has given the chance to us to specify occurrence of damage of tissues of uterus of cows by such difficult diagnosed symptom complex as the subclinical or latent endometritis [8, 14,19].

Table 2 – **Methodical approach to the organization of a research and production research**

| Methods, research objects, production operations | |
|---|---|
| Materials and objects of a research | Of the Cows of the main milk herd of 6 farms located in the Donetsk and Poltava regions; bodies of a reproduction of cows of in Vivo (neck of the uterus, uterus horns, ovaries *) |
| Research methods | · General survey of herd and animals; vaginal survey of cows; rectal differential palpation of bodies of reproduction of cows; ultrasound – scanning **.<br>· Artificial insemination of clinically healthy cows in the spontaneous / induced cycles (frozen sperm of import bulls, according to the selection plan of economy); control of pregnancy.<br>· The analysis of data of primary technological account (the computer selection ORSEK programs [1,3,4,5], "Dairy Plan" [2], "Burenka" [6].<br>· Statistical and comparative analysis of data. |
| The considered indicators | · The considered indicators the Clinical condition of bodies of reproduction of cows with 60 days LP in the absence of fruitful insemination (a metro pathological of different degree of expressiveness).<br>· Indicators of level of reproduction of herd for the current business year.<br>· Pregnancy % after artificial insemination |
| Variable parathypical factors | Factors of influence the Season, the what and climatic region, concentration of a livestock at the enterprise, existence of walking's, level of efficiency of herd, fatness of a milk livestock |

**Note**: * – the analysis of the gonad pathological given on diagnostics and schemes of gynecologic rehabilitation of cows is stated in other works; ** – ultrasonography carried out on a livestock of farms No. 3, 4, 5, 6, a rectal palpation – on all farms.

Frontal survey of a milk livestock and the analysis of operational performance of efficiency we carried out firm "Poltavaplemservice" which results of activity are presented in a number of publications [18, 19] within the scientific and technological plan of work of Laboratory of transplantation of embryos. The obtained data have been used by us for the solution of tasks of the choice of highly productive cows (for the purpose of an embryo donation) and a potential livestock of low-productive cows – recipients. At each enterprise we have carried out schemes of gynecologic rehabilitation of the revealed cows with the subsequent artificial insemination according to requirements of the existing instruction [7]. Given about the carried-out schemes of therapy and methods of diagnostics suitable for reproduction and an embryo donation of cows, we published [16, 19] earlier.

All surveyed enterprises were typical for dairy branch of Ukraine, with rather high level of mechanization of productions and high selection potential of herd as a result of sperm use the Holstein of bulls of foreign selection. Except a dairy complex No. 2, all farms had a stable food supply of own production, good fatness of cows. At all enterprises in diets of cows during the lactation and an-lactation period we have noted imbalance on a number of nutrients with different degree of expressiveness.

The livestock of all surveyed herds has been completely captured by planned ant epizootic actions according to the existing sanitary and veterinary requirements. During researches to health of animals we haven't done harm.

The data obtained throughout all stages have been summarized, statistically processed by us according to the IBM Statistics program – 2011 (Version 20) and presented in the form of tables and charts.

**Main results of a research.** We have shown the generalized results of a gynecologic research of cows which period of lactation was ≥ 60 days in table 3.

The analysis of data has shown reliable increase in incidence of milk cows of a chronic endometritis during a cold season in comparison with warm (on average for 17,42 %). For each economy and the region of border between seasons, as us have been chosen conditionally, taking into account weather and visual signs of response of animals to conditions of keeping. (Ethological signs of a comfortable condition of the lactating cows in the room or on walking). At the same time it should be noted essential scope of fluctuations of incidence: from 11,48 % to 91,16 % during a warm season and, respectively, 35,48-96,95%, in cold. Dynamics of seasonal indicators of

number of cows with a chronic endometritis, depending on the region of an arrangement of a farm, is shown on schedule 1.

Table 3 – **The summarized results of complex gynecologic diagnostics of symptoms of a chronic endometritis at the examined cows**

| № | Animals | Warm season (M ± m) | | | Cold season (M ± m) | | | ±m |
|---|---|---|---|---|---|---|---|---|
| | | n1 | Among them is revealed chronic endometritis | | n 2 | Among them is revealed chronic endometritis | | |
| | | | Cows | % | | Cows | % | |
| 1 | 91 | 61 | 7 | 11,48 | 31 | 11 | 35,48 | 3,09 |
| 2 | 300 | 192 | 159 | 82,81 | 108 | 103 | 93,20 | 1,13 |
| 3 | 245 | 147 | 134 | 91,16 | 98 | 95 | 96,95 | 1,06 |
| 4 | 296 | 127 | 26 | 20,47 | 169 | 114 | 67,46 | 3,30 |
| 5 | 87 | 46 | 8 | 17,39 | 41 | 15 | 36,58 | 2,10 |
| 6 | 331 | 192 | 51 | 26,56 | 139 | 59 | 42,45 | 1,60 |
| Sum | 1350 | 765 | 385 | 50,33[a] | 586 | 397 | 67,75[b] | 1,35 |

**Note:** (a-b) $p<0.05$, at $r = +0,922$

Attracts attention that the most negative background on distribution of chronic metro pathology, is noted on industrial complexes with loose housing contents in sections with high concentration of animals and in industrially polluted region (Donetsk region). The incidence of cows of a chronic endometritis in what climatic comfortable Poltava region was 2-5 times lower all farms ($p < 0.05$, $r = – 0.131$).

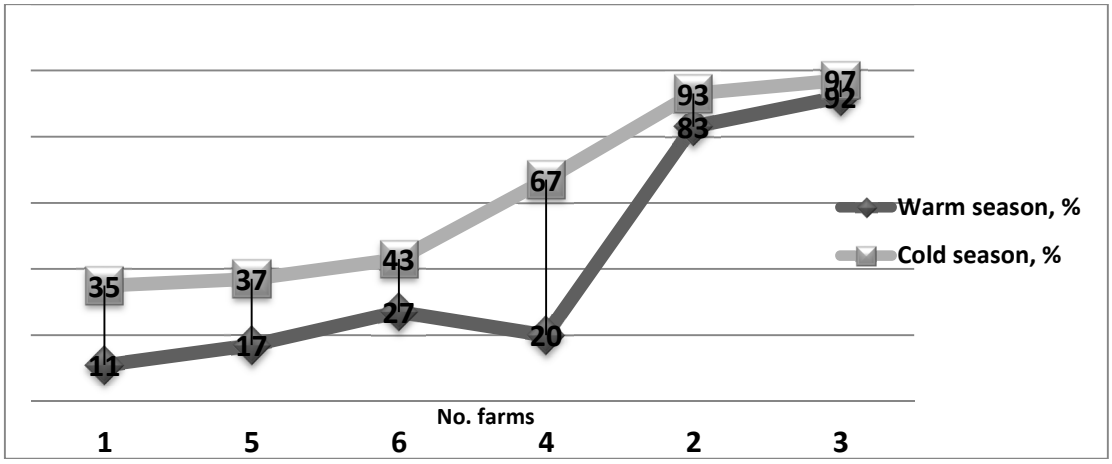


Fig.1. **Seasonal dynamics of spread of chronic endometritises at milk cows in different regions of Ukraine** (n=1350 cows).

Our accounting of level of the actual dairy efficiency of the surveyed herds hasn't revealed, noted in a number of publications [2, 13], direct interrelation between a high yield of milk on herd and high incidence of an endometritis, except a livestock of a breeding farm No. 4 (7 000 kg of milk for a lactation). At this enterprise loose housing sections have been involved in buildings of the facilitated type with high concentration of cows in everyone, walks were not regularly. In comparison with the warm period, at a cold snap the incidence of cows has grown more than 3 times. High frequency of chronic metro pathological for all year is noted at a milk livestock of ecologically unsuccessful region (farm No. 2, 3) which was also contained for life in the enclosed space (without walking's) with a large number of animals in one section (90-125 heads) and continuous rotation of groups (the line principle of production), was 2-5 times lower than climatic comfortable Poltava region ($p>0.05$, $r=-0.131$.).

Recently abroad and also in Ukraine, there were numerous researches on studying of formation of microbial parasite biocenosis in the conditions of the enclosed space of industrial livestock complexes and their negative impact on health and efficiency of animals [13, 16]. Authors have noted the phenomenon of a pre – evolution of pathogenic and opportunistic microorganisms which is expressed in the essential growth of factors of pathogenicity of typical micro flora of livestock farms and increase

in level of dysbiosis at macro organisms, chronic diseases and loss of efficiency turn out to be consequence of what. The analysis of the obtained data confirms significant negative impact on incidence of cows of an endometritis of the damaging complex of a microbial parasite biocenosis of the closed dairy complexes with line technology, action of low temperatures during a cold season only aggravates their current. And, it should be noted that the diagnostics methods available to practical veterinarians existing for today don't provide sufficient accuracy at subclinical inflammatory processes in fabrics of bodies of reproduction of cows. So, results (tab. 4) of the carried-out artificial insemination of cows which have been selected in groups of reproduction after careful survey, a rectal palpation and ultrasound scanning of a uterus, and are recognized clinically healthy (according to requirements of the existing instruction for artificial insemination [7]), have shown in herds with the high level of chronic endometritises – a low pregnancy. Besides, influence even of an insignificant cold snap in an early autumn (farm No. 4 and 6), has significantly reduced quantity of fruitful artificial insemination of cows in comparison with the summer period (respectively, by 17,13 and 28,22 %).

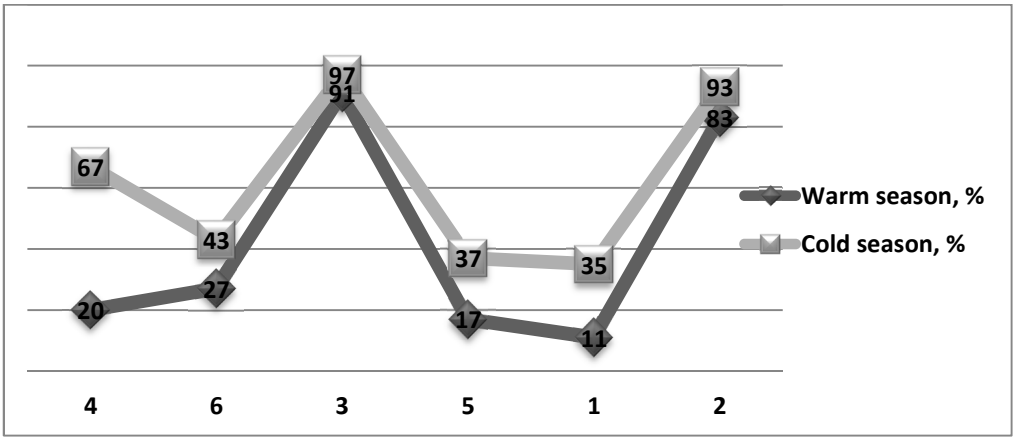


Fig. 2. **Dynamics of seasonality of spread of chronic endometritises at cows in herds with the different level of dairy efficiency (n=1350 cows).**

It is also necessary to note what growth of metro pathological and decrease in fruitfulness of sexual cycles in all farms amplified influence of technological and alimentary stresses as in modern conditions of dairy production of pathology of a metabolism at cows collect gradually, have the hidden character which is shown polymorbidy chronic noncontagious diseases which complicate clinic of endometritises [1, 20. 21]. Thus, the analysis of data has shown the interfaced negative action of a cold season with factors of what and techno origin on incidence of cows of the chronic endometritises provoking a an-pregnancy.

Table 4 – **Effectiveness of artificial insemination of clinically healthy cows in the studied herds during different seasons** (ultrasonography in 45-50 days after an artificial insemination – a farm No. 3, 4, 6; rectal palpation in 50-60 days after AI – a farm No. 1, 2, 5)

| № | Animals | Warm season (M ± m) | | | Cold season (M ± m) | | | ±m |
|---|---|---|---|---|---|---|---|---|
| | | n1 | Pregnancy | | n 2 | Pregnancy | | |
| | | | Cows | % | | Cows | % | |
| 1 | 90 | 61 | 44 | 72,13 | 12 | 7 | 58,33 | 0,81 |
| 2 | -* | - | - | - | - | - | - | - |
| 3 | 245 | 121 | 41 | 33,88 | 52 | 17 | 32,69 | 0,96 |
| 4 | 556** | 390 | 274 | 50,26 | 166 | 55 | 33,13 | 0,66 |
| 5 | 244 | 159 | 104 | 65,41 | 85 | 26 | 43,59 | 0,67 |
| 6 | 103 | 65 | 44 | 67,69 | 38 | 15 | 39,47 | 0,58 |

**Note:** * – the uterine livestock of cows of a dairy complex No. 2 in connection with deficiency of a fodder diet and technological reoperation in large quantities showed inferiority of sexual cycles and / or an cycles owing to what insemination hasn't been carried out to the registration term; ** – according to a monitoring research of Institute for Animals NAAS Ukraine of livestock production [2].

Studying and accounting of these damaging complexes factors will allow to optimize reproductive longevity of milk herd, and duration of productive use of dairy cows correlates with efficiency of dairy cattle breeding.

**Conclusions.** 1. Reliable increase on average for 17,42% of prevalence of symptoms of a chronic endometritis among cows of different dairy farms is experimentally established, and the accompanying negative impact of ecological trouble of the region of an arrangement of a farm is noted.

2. It is established that the highest incidence of cows of a chronic endometritis in the enterprises with the industrial production technology and high concentration of a livestock at without walking's contents (respectively, during the warm period of 82,81-91,16%, in cold – 93,20-96,94%).

3. It isn't established to direct interrelation between growth of incidence of cows of a chronic endometritis and level of the actual dairy efficiency on herd: the most large number of metro pathological is noted in herd with efficiency 4 200 kg of milk (82,81-93,20%), and the lowest level – at 4 300 kg (11,48-35,48%) that speaks about the prevailing influence on reproductive health of cows ecological and climatic technology factors.

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**Сезонная динамика распространения хронических эндометритов среди поголовья коров разных регионов Украины**

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Представлен анализ результатов комплексного сезонного гинекологического обследования лактирующих коров шести молочных предприятий, расположенных в Полтавской и Донецкой областях. Достоверно установлено повышение забо-

леваемости коров хроническим эндометритом в холодный сезон в среднем на 17,46 % (среди 1350 обследованных коров), причем отмечено существенное колебание роста уровня метропатий в разных стадах: от 5,78 % до 46,99 %. Достоверно выявлено негативное влияние на заболеваемость хроническим эндометритом расположения комплекса в экологически загрязненном регионе при постоянном содержание коров в закрытых помещениях (диагностировано 82,81-91,16 % метропатий в теплый сезон и 93,20-96,94 % в холодный, соответственно). Не установлено прямой корреляции между уровнем молочной продуктивности коров и заболеваемостью хроническим эндометритом, что свидетельствовало о превалирующем влиянии на репродуктивное здоровье животных экологических и технологических факторов.

**Ключевые слова**: лактирующие коровы, хронический эндометрит, субклинические метропатии, сезонность, эко-климатический фактор, промышленный комплекс, воспроизводство.

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## DISTRIBUTION AND TREATMENT OF DIROFILARIOSIS OF DOGS IN THE TOWN OF BILA TSERKVA

Проведеними дослідженнями встановлено, що на ураженість собак дирофіляріями впливають різні фактори: вік, стать, порода, тип утримання, сезонність. Максимально ураженими виявилися собаки у віці 4–6 років. Самців хворих на дирофіляріоз собак було більше, ніж самок. Більш високу екстенсивність інвазії реєстрували у собак порід: німецька вівчарка, кавказька вівчарка, такса, лайка та безпорідні.

Максимально інвазованими виявилися дворові собаки, екстенсивність інвазії яких становила 35,9 %. Меншою мірою були уражені квартирні собаки, екстенсивність інвазії яких становила 10,2 %.

Дворові та мисливські собаки уражувалися дирофіляріями значно частіше через більший контакт з комарами – проміжними живителями.

Клінічно у хворих на дирофіляріоз собак спостерігали кашель, важке дихання, пригнічення, відмову від корму, збільшення черева, іктеричність кон'юнктиви. Під час аускультації виявили шум під час систоли. Пульс був слабким. Відмічали аритмію. Спостерігали набряки, слоновість кінцівок, нервові явища, внаслідок інтоксикації розвивалася гемолітична анемія та лейкоцитоз.

Лікування з використанням дектомаксу в дозі 1 мл на 16 кг маси тіла підшкірно, глюкози з аскорбіновою кислотою, ізотонічного розчину натрію хлориду, фраксипарину, дифенгідраміну, отопротектину, рибоксину, катозалу та амоксициліну було ефективним і привело до відновлення клінічного стану та гематологічних показників у собак за дирофіляріозу без ускладнень.

**Ключові слова:** дирофіляріоз, собаки, порода, вік, стать, тип утримання, екстенсивність інвазії, діагностика, лікування, дектомакс.

**Problem statement.** Dirofilaria is an extremely urgent problem in Ukraine, as it becomes enzootic. Most often, dirofilaria dogs are found in southern regions of Ukraine. The number of affected with dirofilariosis dogs and humans is increasing every year, as this is contributed to a number of factors. Because of the adaptive properties of dirofilaria the number of intermediate hosts increases, the movement of animals in the territories of different regions are not controlled, destruction of blood-sucking insects and their habitats is the improper, there are difficulties of diagnosis and treatment [1–4].

**Analysis of recent researches and publications.** First dirofilaria dogs were registered in 1856 (D. Immitis) and in 1911 (D. repens, in the Crimea). In the Central regions of Ukraine dirofilaria was registered by T. Mishishin in 1988 [2].

Study of dirofilariosis in Ukraine and abroad engaged Arkhipova D. R., Wasylyk, N. Potocki M. K., Chernov V. N., Koltas I. S., Tarello W., Clemence R. G. [1–5].

In the 90-ies in Ukraine have been isolated cases of dirofilariasis of dogs, and then an increase in the number of bollène: 1997 – 3 %, in 1999 21 %, in 2002 – 55% of the studied over the years. Dirofilaria dogs were registered in the Crimea, Chernihiv, Kharkiv, Sumy and Poltava regions, in Odessa, Sevastopol, Simferopol, Kharkov. In the Kiev region dirofilaria was first diagnosed in 1998 at the clinic of veterinary medicine and old Kiev Pechersk districts of Kiev. In Kiev the number of cases of dogs amounted to: in 1999 to 15 cases in 2000 – 130, 2001 – 188, 2002 – 354, 2003 – 600 cases [2–4].

Dirofilaria registered in 2013 in Ukraine in 291 dogs [1–4].

During 1998–2000 in Odessa revealed 38 cases of dogs aged 2 to 10 years.

In Ukraine in the period 1975–1995. recorded 50 cases of dirofilariasis of people, in 1996 – 2000 – 41, 2001–2002 77 cases. In 2002, the register 52, and in 2003, 25 cases of human dirofilariasis [1–4].