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IMPROVING THE REPRODUCTIVE ABILITY OF THE DAIRY CATTLE

Abstract. Based on the gynecological monitoring of 341 cows (268 heads of Simmental breed and 73 heads of Red Steppe breed) of the herd of Bagration 2 farm, performed using rectal medical examination and ultrasound diagnostics, it was found that 42 heads, or 12.3%, were with hypo-ovaria, 14 heads, or 4.1% - with a cyst, 37 heads, or 10.8%, - with inflammation of the uterine lining (endometritis). It has been established that among gynecological diseases, in the Simmental breed, hypo-ovaria (78.6%) and cyst (57.1%) are more common, and in the Red Steppe breed - endometritis (51.4%) and ovarian cyst (42.9%). The number of animals with characteristic signs of hypofunction was only 42 heads, which accounted for 12.3% of the total herd, of which, when distributed by age groups, it was found that 32 heads, or 76.2%, of the third calving and older, 6 heads, or 14.3%, - of the second calving, the remaining 4 heads, or 9.5% - of the first calving, i.e. with age, the number of sick cows naturally increases.

In the context of breeds, the same age dynamics was noted: with ovarian dysfunction, there are 28 cows of the 3rd calving and older in the Simmental breed or 84.9%, and 4 cows or 44.5% - in the Red Steppe breed. As for cows of the 2nd calving - 4 heads or 12.1%, of the Simmental breed, and 3 heads or 33.3% - of the Red Steppe breed. For the first calving cows, respectively, 1 head or 3.0%, and 2 heads or 22.2%. On the basis of gynecological monitoring, 2 groups of cows were formed: the first group - the control (without disturbances in the reproductive system), the second group - the experimental group (with hypo-ovaria). A total of 82 heads were divided into two groups, of them in the control group 30 heads or 75.0%, of the Simmental breed, and 10 heads or 25.0% - of the Red Steppe breed. In the experimental group, 33 heads or 78.6%, and 9 heads or 21.4%, respectively. When using the first scheme of hormonal stimulation of the estrus in the experimental group of 22 heads, at the end of the treatment, signs of estrus were found in 20 cows, which averaged 90.9%. When applying the second scheme of treatment, of 20 heads of the experimental group, 17 animals have had estrus or 85.0%. In total, as a result of the hormonal treatment of 42 heads of cows with ovarian dysfunction, the sexual cycle was restored, i.e. estrus was revealed followed by artificial insemination in 37 heads, which was 88.1%. When comparing the results of using two schemes of hormonal stimulation, it was found that the use of CIDR increased the fertility of cows by 5.9%. With the use of ultrasound diagnostics in 28 cows (14 heads were repeatedly bred on the natural cycle), the fertility of insemination was 66.7% since their pregnancy was established. When using the hormonal treatment scheme with Fertagil, from 23 cows with a follicular cyst during ultrasound diagnostics on the 10-12 day before PG F-2 α injection, 7 heads showed no ovarian follicular cysts, which is 36.8%. When using the Surfagon drug and ultrasound diagnostics on the 12-14 day before the PG F-2 α injection, the number of cows without signs of follicular cyst in the ovaries was 10 heads or 43.5% of the amount of hormonally treated. According to the results of artificial insemination of treated animals, the fruitfulness from the first insemination was 42.8% in the group treated with Fertagil and 40% in the group treated with Surfagon.

Keywords: reproduction, recovery of impaired reproductive function, artificial insemination, estrus, hormonal treatment, stimulation of superovulation, prevention, treatment.

Relevance. Decreasing of cattle fertility is associated with functional disorders of the reproductive organs that are often detected in animals, including impaired ovarian functional activity, manifested in the form of hypo-ovaria or cyst and inflammation of the uterine lining. The problems associated with the reproduction of highly productive dairy cattle, especially a long period of the reproductive cycle, the lactation dominant and the risk of infertility are among the most crucial in dairy cattle breeding [1, 2].

Delayed reproduction cycles, i.e. timely insemination and pregnancy in dairy cows for 1-2 months, lead to a decrease in productivity by an average of 9-18%. One of the main reasons is the impairment of the functional activity of the sex glands in fresh cows. Ovarian dysfunction, i.e. a disorder of the functional activity of the sex glands in cows develops, as a rule, against the background of impaired metabolism and an enhanced manifestation of lactational dominant, accompanied by a disorder of the endocrine mechanisms regulating the functional activity of the sex glands. The active synthesis of the lactogenic complex at the peak of milk production, especially the first 2-4 months after calving, reduces the synthesis of gonadotropic hormones (LH, FSH, and estrogens). According to the results of research of Nezhdanov A.G. [3], the disorder of the functional activity of the sex glands, manifested in the form of hypo-ovaria, is recorded on average in 32.9% of cows, of which 36.1% in first-calf cows and 20% each in second and third calving cows

Along with this, a parallel of the common pathologies in most livestock farms is inflammation of the uterine lining in the postpartum period. The clinical form of the disease affects every third cow, and in highly productive herds the disease is diagnosed in 70-80% of animals. Subclinical endometritis is recorded in 70% of infertile cows. Culling and slaughter of infertile animals due to endometritis reach 50% of the diseased animals [4].

Postpartum endometritis contributes to one of the most serious problems of dairy cattle breeding - infertility of cows, causing significant economic damage resulting from losses due to lack of milk, undersupply of offspring, premature culling of highly productive cows and non-production costs for keeping, feeding, examination and treatment of sick animals. According to the duration and characteristics of the course, there are acute, subacute and chronic inflammatory processes with a corresponding duration of infertility. Related reasons in the occurrence of postpartum endometritis include violation of maintenance conditions, feeding, exploitation, and reduction of the immunobiological status of animals [5].

Studies carried out on Black-and-motley cows showed that rate of fertilization by the first insemination in the "Mir" breeding farm was 77.5% with a conception rate of 1.3, in the Nadezhda breeding farm - 65.0% and 1.5., in the General Skobelev pedigree farm - 63.3% and 1.7, respectively. Thanks to a scientifically ground choice of insemination time, the fertilization rate of cows significantly increased (by 22.1%), the percentage of overlap and semen consumption per fertilization was reduced from 3.4 to 1.5 doses [6].

According to the research results of some authors [7], when imported in 2010-2013 the Holstein breed of the black-and-motley color from Germany to Zolotaya Niva CJSC of the Safonovsky district of the Smolensk region, 0.8% of heifers dropped out during transportation and quarantine. During the year, 191 heads of heifers were dropped out in the complex, or 16.1% of calved animals. Diseases of the reproductive organs and the mammary gland (24.6%), disorders of the muscle-skeleton and distal extremities (22.0%), diseases of the digestive system (7.8%), respiration, and the cardiovascular system (25.5%) and other diseases (20.1%) were the main reasons of the dropout. In 2013, the first lactation was completed by 1242 first-heifers with an average yield of 7288 kg of milk with a fat content of 3.87% and protein of 3.30%. Live weight of animals was 515 kg.

Concerning the inflammatory processes of the uterine lining as the most problematic and widespread pathology in any farm, in this case, there are many methods and ways of treating and restoring the uterus function, both with high and low performance. In the majority, which is based on intrauterine injections of antimicrobials or intramuscular injections of antibiotics. As practice shows, in some cases, inflammatory processes of the uterine lining, despite the labor-intensive therapeutic measures, acquire a chronic form (up to 5%) that complicates the recovery processes and ultimately leads to infertility of animals. In connection with the study, a comparative assessment of methods for restoring sexual cyclicity, improving the fertility of cows with dysfunctional state of the ovaries and restoring the function of the uterine lining is a current area of agricultural science and production. [8, 9].

Studies show that the reproductive function of cows is most affected by maintenance conditions, exercise and the level of feeding. Against the background of hypodynamia in the reproductive apparatus, which develops most often in the stall period, with a predominance of a tie-up or crowded animal housing, the pronounced forms of disorders develop, manifested by ectasia of the vascular system, especially the microvascular bed and the venous section. As a result, edema occurs in the cortical zone of the ovary, and in the vascular zone this leads to stasis and egg atresia occurs in the follicles. In the uterus, changes occur in the epithelium of the mucous membrane and its glandular apparatus, leading to the formation of erosions. In eroded areas of the mucous membrane, the inflammation develops. Therefore, with climatic sterility in cows, ovarian cycles are observed in the form of hypo-ovaria and inability of the uterine lining to perceive the fetus due to their inflammation [10].

The wide occurrence of hypo-ovaria is mainly associated with the technology of keeping animals against the background of an imbalance in the diet of feeding and the disparity between the level of feeding and the output. At the same time, the frequency of hypo-ovaria is significantly higher in animals with low fatness compared to the fair condition, which is an indicator of a shortage of energy consumed along with food. At the same time, the content of concentrated feed from the total amount of dry matter of the diet by more than 45% (in highly productive herds) also leads to ovarian disorders in the form of luteal and follicular cysts, which also adversely affects the effectiveness of insemination. Given the different levels of productivity of cows in the production herd, the manifestation of ovarian dysfunction in the form of hypo-ovaria or cysts in a certain number of animals is the irreversible process. In this regard, the rational use of options for the restoration of reproductive functions, based on the exogenous administration of hormonal drugs to stimulate the growth and development of follicles and the restoration of sexual cycles of cows [11].

Before hormonal treatment, animals are examined rectally to determine the size and shape of the ovaries, the presence and severity of the corpus luteum. The luteal phase of the cycle corresponds to the optimal time for injection of drugs. Prostaglandin is administered intramuscularly in the doses indicated in the application instructions. As a rule, animals are bulling 48-72 hours after drug injection. Non-hunting animals are re-treated 10-11 days after the first injection. Double injection of the drug (in any phase of the sexual cycle) with a 10-day interval is effectively used on a large population, as this drives up the number of animals that show signs of estrus by up to 90%, and reduces the labor intensity of operating personnel. The use of this scheme is applicable only for animals with monthly full sexual cycles, i.e. for healthy cows without violations of sexual cycles or for animals with persistent corpus luteum, as well as for cows with a corpus luteum cyst (luteal cyst) [12].

Currently, the natural possibilities of cows to reproduce themselves are not used intensively. Not infrequently there are no veterinary specialists in business entities that dealt with the elimination of violations of the reproductive function of cows. As a result, a high percentage of barrenness, infertility of cows and the shortfall in the planned calf. Therefore, it will be necessary to engage in the prevention and treatment of cows for obstetric and gynecological diseases. At the same time, methods and techniques for improving the reproductive function, treatment regimens, organizing and conducting the preventive measures need to be advanced. In this regard, it is planned to work on enhancing the methods and techniques that increase the reproductive qualities of cows and heifers in basic farms [15].

Currently, the development and introduction of innovative technologies is a sunrise industry in all areas of production, including the reproduction of highly productive breeding cattle. In the light of these tasks, it is urgent to conduct research on the causes of obstetric-gynecological diseases and the working out of methods for their prevention and treatment in highly productive pedigree cattle of the Republic of Kazakhstan.

The aim of the research. Formation of experimental groups of the Simmental and the Red Steppe cows for rectal medical examination based on monitoring of dairy cattle herd in order to identify the causes of reproductive disorders and inflammatory diseases and analysis of the average semen consumption for 1 productive insemination of healthy and sick animals.

Research methods. The object of the research was the breeding stock of dairy cattle of the Simmental and Red Steppe breeds of the farm “Bagration 2” of the Ulan district, East-Kazakhstan region, with a population of 341 heads.

Monitoring of dairy cattle was performed by gynecological clinical examination of the breeding stock and using the IscanIS P RS PC ultrasound scanner (Poland). Based on gynecological monitoring, 2 groups of cows were formed: able to reproduce and with gynecological diseases.

The significant part in the modern technology of reproduction of cattle is hormonal stimulation. Before hormonal treatment, animals are examined rectally to determine the size and shape of the ovaries, the presence and severity of the corpus luteum. The luteal phase of the cycle corresponds to the optimal time for injection of drugs. Prostaglandin is administered intramuscularly in the doses indicated in the application instructions. As a rule, animals are bulling 48-72 hours after injection of the drug. Non-hunting animals are re-treated 10-11 days after the first PG F-2 α injection. Double injection of the drug (in any phase of the sexual cycle) with a 10-day interval is effectively used on a large population, as this drives up the number of animals that show signs of estrus by up to 90%, and reduces the labor intensity of operating personnel. The use of this scheme is applicable only for animals with monthly full sexual cycles, i.e. for healthy cows without violations of sexual cycles or for animals with persistent corpus luteum, as well as for cows with a corpus luteum cyst (luteal cyst). For hormonal stimulation of estrus, 2 progesterone treatment schemes were used (Scheme I - using CIDR, Scheme II - using 2.5% progesterone solution).

Normalization of the physiological processes of the genitals of experimental cows was established on the basis of ultrasound diagnostics (accumulation of pathological exudate and proliferative changes in endometrial tissues), the character of estrus during sexual hunting, and fertility during the insemination. Prevention of obstetric and gynecological diseases is based on the intrauterine administration of "Iodopen", "Utrakur" antimicrobial foam-forming tablets three times with an interval of 24 hours, as well as the injection of oxytocin and the PG F-2 α group drugs and intrauterine administration of oxytetracycline 200 during the retention of placenta.

Studies were conducted according to the scheme (Figure 1).

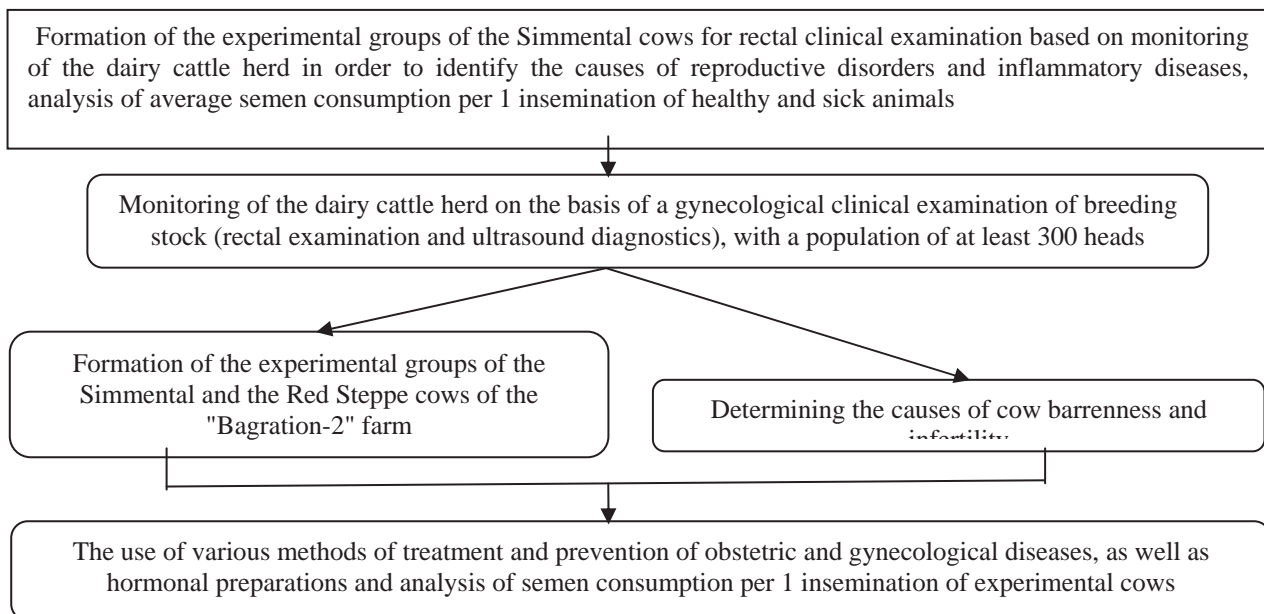


Figure 1 - Scheme of research practice

The obtained material was processed by the method of variation statistics proposed by V.F. Lakin [16].

Research results. Annual production of calves from high-yielding cows is impossible without the use of hormonal and other auxiliary drugs. The widespread classical scheme of hormonal stimulation of estrus in cattle involves the injection of preparations of the prostaglandin F²- α group: Oestrophan, Cloprostenol, Estrumate, Dinolytic, etc. The demonstration of estrus can be expected in cases when by the time of processing of these drugs in the ovaries of animals there is an active corpus luteum, or, besides, an inactive small corpus luteum [17].

The property of prostaglandin drugs is based on the resorption of the corpus luteum (luteolysis), secreting the hormone progesterone, which inhibits the subsequent start of the sexual cycle. Before hormonal treatment, animals are examined rectally to determine the size and shape of the ovaries, the presence and severity of the corpus luteum. [18].

The luteal phase of the cycle corresponds to the optimal time for injection of drugs. Prostaglandin is administered intramuscularly in the doses indicated in the application instructions. As a rule, animals are bled 48-72 hours after drug injection. Non-hunting animals are re-treated 10-11 days after the first injection. Double injection of the drug (in any phase of the sexual cycle) with a 10-day interval is effectively used on a large population, as this drives up the number of animals that show signs of estrus by up to 90%, and reduces the labor intensity of operating personnel. The use of this scheme is applicable only for animals with monthly full sexual cycles, i.e. for healthy cows without violations of sexual cycles or for animals with persistent corpus luteum, as well as for cows with a corpus luteum cyst (luteal cyst) [19].

For high-yielding cows with anovulatory sexual cycle, hormonal stimulation of the estrus according to the Ovsynch and Pre-synch program is widespread throughout the world. The fertility rate from the first insemination averages 20%. This scheme is used mainly for cows with no signs of estrus for more than 2 months after calving. The essence of this program is that by increasing the dose of the injection, the releasing hormone to ovulate the follicle and to form a functioning corpus luteum. On the 7-9 day, by injecting the F²- α prostaglandin drug, to suppress the level of the hormone progesterone in the blood and, under the influence of these hormones, the cow enters the estrus and the repeated administration of the releasing hormone stimulates the ovulation of the preovulatory follicle [20]. According to this program, cows can be inseminated without signs of sexual hunting and estrus. In some cases, the cycle is repeated until the signs of sexual activity appear. This cycle for cows can be repeated up to 4 times or more.

A comparatively more effective scheme for hormonal stimulation of the estrus is progestogen treatment. This program is the most effective for cows of the dairy productivity, in which the percentage of animals with anovulatory sexual cycle due to hypo-ovarian is very high in the herd [21].

Accepting the stimulation and synchronizing of estrus with progesterone, a female sex hormone that regulates the estrus cycle, make possible for the appearance of estrus in groups of breeding animals in the same time period [22].

On the basis of this hormone, the various schemes for estrus stimulation and synchronization have been proposed. High doses of progesterone block the release of gonadotropic hormones from the pituitary and cause the retention in hunting, estrus, and ovulation. The termination of progesterone injections and the subsequent introduction of HPMS (hormonal pregnant mare serum) causes the synchronization of hunting, estrus, and ovulation. The progestogen treatment program comprises the intravaginal administration of a progesterone-containing drug (pessary) on the basis of a sponge or a plastic with a simultaneous intramuscular injection of estradiol. On the 8th day, the progesterone sponge is removed, after which HPMS is administered one time (at a dose of 500 I.U.) and estradiol is injected on the 9th day. With this treatment scheme, the signs of sexual activity on the 10th day occur in 80% of the cows. For the sake of exception of late ovulation of follicles, synthetic analogues of gonadotropin releasing hormone are used to promote the release of luteinizing hormone for follicle ovulation at a fixed time [23, 24, 25].

At this stage of the development of dairy cattle husbandry, based on the formation of commercial-dairy farms with highly productive dairy cattle on the base of imported animals or the use of foreign gene pool, the issue of temporary infertility of animals after calving is topical. One of the most common causes occupying a significant place among all diseases of the ovaries is hypo-ovaria. When hypofunction of the ovaries occurs, there is a weakening of the ovaries activity, which is accompanied by arrhythmia or inferiority of sexual cycles, as well as a prolonged absence after calving. Under the hypo-ovaria lies the condition in which the growth, development, maturation and ovulation of follicles are impaired. There is a sharp decrease in the level of vitamin A in the blood, collagenization of the tissues of the sex glands and weakening of the redox reactions in the endometrium, accompanied by low uterus contractility.

As a result, sexual cyclicality is violated or completely stopped, unfavorable conditions are created in the genitals for the promotion of sperm cells, which in most cases is manifested by the infertility of animals. At rectal examination there is a rigidity of the uterus, the ovarian consistency is homogeneous, the shape is flattened or rounded, the surface is smooth, reduced in volume, the corpus luteum or follicles

are not detected, of the elastic-dense consistency. The concentration of follicle-stimulating hormone in animals with hypofunctional state is 2.5 times lower, and the content of luteinizing hormone is 1.1 lower compared with clinically healthy cows that indicates a decrease in the activity of the hypothalamic-pituitary system and leads to a violation of folliculogenesis.

Based on the gynecological monitoring of 341 cows (268 heads of Simmental breed and 73 heads of Red Steppe breed) of the herd of Bagration 2 farm, performed using rectal examination and ultrasound diagnostics, it was found that 42 heads, or 12.3%, were with hypo-ovaria, 14 heads, or 4.1% - with an ovarian cyst, 37 heads, or 10.8%, - with inflammation of the uterine lining (endometritis) (Table 1).

Table 1 - Results of gynecological monitoring of cows by breed

Breed	Hypo-ovaria		Ovarian cyst		Inflammation of the uterine lining	
	n	%	n	%	n	%
	Simmental	33	78.6	8	57.1	18
Red Steppe	9	21.4	6	42.9	19	51.4
Total	42	100	14	100	37	100

It has been established that among gynecological diseases, in the Simmental breed, hypo-ovaria (78.6%) and cyst (57.1%) are more common, and in the Red Steppe breed - endometritis (51.4%) and ovarian cyst (42.9%).

The causes of obstetric and gynecological diseases are caused, first of all, by the weakening of the overall resistance of the organism and metabolic disorders. The main factor predisposing to the disease is the imbalance of the diet in terms of acid-base equivalents, minerals, and vitamins, as well as keeping conditions and level of productivity of cows. The metabolic disorder, in turn, causes endocrine insufficiency and hormonal disorders, which leads to a breakdown of the neurohumoral regulation of sexual functions and favorable conditions are created for the development of pathogenic microflora in the genitals, which brings the inflammatory processes.

Gynecological diseases were analyzed in connection with age and breed variability (table 2).

It was established that the number of animals with specific signs of hypofunction was only 42 heads, which accounted for 12.3% of the total herd, of which, when distributed by age groups, it was found that 32 heads or 76.2% were of the third calving and older, 6 heads or 14.3% - of the second, the remaining 4 heads or 9.5% - of the first calving, i.e. with age, the number of sick cows naturally increases.

In the context of breeds, the same age dynamics was noted: with ovarian dysfunction, there are 28 cows of the 3rd calving and older in the Simmental breed or 84.9%, and 4 cows or 44.5% - in the Red Steppe breed. As for cows of the 2nd calving - 4 heads or 12.1%, of the Simmental breed, and 3 heads or 33.3% - of the Red Steppe breed. For the first calving cows, respectively, 1 head or 3.0%, and 2 heads or 22.2%.

Table 2 - Distribution of cows with functional disorders of the ovaries in the form of their hypofunctions in the context of lactation

Age in lactations	Total		Simmental		Red Steppe	
	n	%	n	%	n	%
of the first calving	4	9.5	1	3.0	2	22.2
of the second calving	6	14.3	4	12.1	3	33.3
of the third calving and older	32	76.2	28	84.9	4	44.5
Total	42	100	33	100	9	100

Hormonal stimulation of estrus dramatically changes the hormonal status in comparison with the natural cycle. Various pituitary gonadotropins have similar ways of application and are close in effectiveness, but they are also affected by breeding and productive properties.

On the basis of gynecological monitoring, 2 groups of cows were formed: the first group - the control (without disturbances in the reproductive system), the second group - the experimental group (with hypo-ovaria). They are presented in Table 3.

Table 3 - Characteristics of the formed groups

Groups	Total, heads	Including by breeds	
		Simmental	Red Steppe
Control	40	30	10
Experimental	42	33	9
Total	82	63	19

A total of 82 heads were divided into two groups, of them in the control group 30 heads or 75.0%, of the Simmental breed, and 10 heads or 25.0% - of the Red Steppe breed. In the experimental group, 33 heads or 78.6%, and 9 heads or 21.4%, respectively.

On the basis of the formation of the experimental group, it was taken the most common gynecological disease in Bagration 2 Farm (78.6%), such as hypo-ovaria, or their hypoplasia, which causes frigidity of the breeding stock.

It was established that when using the first scheme of hormonal stimulation of the estrus in the experimental group of 22 heads, at the end of the treatment, signs of estrus were found in 20 cows, which averaged 90.9%. When applying the second scheme of treatment, of 20 heads of the experimental group, 17 animals have had estrus or 85.0%. In total, as a result of the hormonal treatment of 42 heads of cows with ovarian dysfunction, the sexual cycle was restored, i.e. estrus was revealed followed by artificial insemination in 37 heads, which was 88.1%. When comparing the results of using two schemes of hormonal stimulation, it was found that the use of CIDR increased the fertility of cows by 5.9%.

With the use of ultrasound diagnostics in 28 cows (14 heads were repeatedly bred on the natural cycle), the fertility of insemination was 66.7% since their pregnancy was established.

This pathology (hypo-ovaria) is characterized by an increase in the volume of the ovary with a gently fluctuating spherical formation with a diameter of more than 2 cm or at ultrasound diagnostics by the presence of a liquid formation on 2/3 of the ovary surface. In this connection, the classical scheme of treatment of follicular cysts using the drugs of the Fertagil and Surfagon group in a comparative aspect was applied for therapeutic measures. According to the results of therapeutic measures, the following results were obtained (table 5).

Table 4 - Comparative results of hormonal stimulation of estrus of cows with hypo-ovaria

Group	Total, heads	Scheme I			Scheme II		
		Total, heads	With estrus, heads		Total, heads	With estrus, heads	
		n	n	%	n	n	%
Experimental	42	22	20	90.9	20	17	85.0
Control	40	20	20	100	20	20	100
Total	82	42	40	95.2	40	37	92.5

Table 5 - Comparative results of the use of releasing hormones in ovarian follicular cyst in cows

Drug	Total, heads	treated by 1st course		Fruitfully inseminated from the treated, heads	
		n	%	n	%
Fertagil	19	7	36.8	3	42.8
Surfagon	23	10	43.5	4	40.0
Total	42	17	40.5	7	41.4

When using the hormonal treatment scheme with Fertagil, from 23 cows with a follicular cyst at ultrasound diagnostics on the 10-12 day before PG F-2 α injection, 7 heads showed no ovarian follicular cysts, which is 36.8%. When using the Surfagon drug and ultrasound diagnostics on the 12-14 day before the PG F-2 α injection, the number of cows without signs of follicular cyst in the ovaries was 10 heads or 43.5% of the amount of hormonally treated. According to the results of artificial insemination of treated animals, the fruitfulness from the first insemination was 42.8% in the group treated with Fertagil and 40% in the group treated with Surfagon.

When conducting the research, it was also found that at ultrasound diagnostics on the 4-5 day after PG F-2 α treatment, an average of 70-75% of animals showed no cysts, whereas at repeated ultrasound diagnostics, before the introduction of PG F-2, follicular cysts in the ovaries were found on average in 70% of animals, which is explained by the re-formation of new cysts in the period of 10-12 days. Also in animals with follicular cysts, spontaneous sexual cycle and estrus occur every 10–13 days, with the majority of such animals showing follicular cysts in both ovaries, and of the total number of animals, on average 90% of animals showed cysts on the left ovary.

Thus, according to the research results in restoring functional disorders of the ovaries, it has been established that the use of the progestogen hormone stimulation scheme for cows with ovarian dysfunction is the most effective in restoring the sexual cycle. The obtained results indicate that the introduction and widespread use of this hormonal stimulation scheme in the reproduction of highly productive dairy cattle will allow to use to the maximum of the reproductive potential of highly productive breeding stock, including first-calf cows, which will reduce the service period. Taking into account the low impact of the used treatment schemes of follicular cysts, further research in this direction is required to increase the effectiveness of the schemes after the first course to 60 percent and more.

The main part in obstetric and gynecological interventions is the prevention of ill health, which is based on the universal early obstetric and gynecological treatment with foam-forming drugs for dry therapy of the fresh cows uterine, especially since the functional disorders of the ovaries in some cases are due to inflammation of the uterine lining (endometritis).

Conducting systematic preventive measures would reduce the number of animals with inflammatory processes in the uterus, and the current gynecological clinical examination could identify deficiencies in feeding and maintenance, correctly follow the schedule for the duration of the dry period and the timely elimination of detected deficiencies. This work to establish the effectiveness of preventive measures for postpartum endometritis in fresh cows will be continued.

Summary and evaluation of the research results. Based on the gynecological monitoring of 341 cows (268 heads of Simmental breed and 73 heads of Red Steppe breed) of the herd of Bagration 2 farm of the East Kazakhstan region, performed using rectal medical examination and ultrasound diagnostics, it was found that 42 heads or 12.3% were with hypo-ovaria, 14 heads or 4.1% - with an ovarian cyst, 37 heads or 10.8% - with inflammation of the uterine lining (endometritis). It was noted that among gynecological diseases, hypofunction (78.6%) and ovarian cyst (57.1%) are more common for the Simmental breed, and for the Red Steppe - endometritis (51.4%) and ovarian cyst (42.9%).

The reasons for obstetric and gynecological diseases are caused, first of all, by the weakening of the overall resistance of the body and metabolic disorders. The main factor predisposing to the disease is the imbalance of the diet in terms of acid-base equivalents, minerals, and vitamins, as well as keeping conditions and the level of productivity of cows [26].

The metabolic disorder, in turn, causes endocrine insufficiency and hormonal disorders, which leads to a breakdown of the neurohumoral regulation of sexual functions and favorable conditions are created for the development of pathogenic microflora in the genitals, which brings the inflammatory processes.

The number of animals with specific signs of hypofunction was only 42 heads, which accounted for 12.3% of the total herd, of which, when distributed by age groups, it was found that 32 heads or 76.2% were of the third calving and older, 6 heads or 14.3% - of the second, the remaining 4 heads or 9.5% - of the first calving, i.e. with age, the number of sick cows naturally increases.

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On the basis of gynecological monitoring, 2 groups of cows were formed: the first group - the control (without disturbances in the reproductive system), the second group - the experimental group (with hypo-ovaria). A total of 82 heads were divided into two groups, of them in the control group 30 heads or 75.0%, of the Simmental breed, and 10 heads or 25.0% - of the Red Steppe breed. In the experimental group, 33 heads or 78.6%, and 9 heads or 21.4%, respectively.

On the basis of the formation of the experimental group, it was taken the most common gynecological disease in Bagration 2 Farm (78.6%), such as hypo-ovaria, or their hypoplasia, which causes frigidity of the breeding stock.

When using the first scheme of hormonal stimulation of the estrus in the experimental group of 22 heads, at the end of the treatment, signs of estrus were found in 20 cows, which averaged 90.9%. When applying the second scheme of treatment, of 20 heads of the experimental group, 17 animals have had estrus or 85.0%. In total, as a result of the hormonal treatment of 42 heads of cows with ovarian dysfunction, the sexual cycle was restored, i.e. estrus was revealed followed by artificial insemination in 37 heads, which was 88.1%. When comparing the results of using two schemes of hormonal stimulation, it was found that the use of CIDR increased the fertility of cows by 5.9%.

With the use of ultrasound diagnostics in 28 cows (14 heads were repeatedly bred on the natural cycle), the fertility of insemination was 66.7% since their pregnancy was established.

At the hormonal treatment scheme with Fertagil, from 23 cows with a follicular cyst at ultrasound diagnostics on the 10-12 day before PG F-2 α injection, 7 heads showed no ovarian follicular cysts, which is 36.8%. When using the Surfagon drug and ultrasound diagnostics on the 12-14 day before the PG F-2 α injection, the number of cows without signs of follicular cyst in the ovaries was 10 heads or 43.5% of the amount of hormonally treated. According to the results of artificial insemination of treated animals, the fruitfulness from the first insemination was 42.8% in the group treated with Fertagil and 40% in the group treated with Surfagon.

When conducting the research, it was also found that at ultrasound diagnostics on the 4-5 day after PG F-2 α treatment, an average of 70-75% of animals showed no cysts, whereas at repeated ultrasound diagnostics, before the introduction of PG F-2, follicular cysts in the ovaries were found on average in 70% of animals, which is explained by the re-formation of new cysts in the period of 10-12 days. Also in animals with follicular cysts, spontaneous sexual cycle and estrus occur every 10-13 days, with the majority of such animals showing follicular cysts in both ovaries, and of the total number of animals, on average 90% of animals showed cysts on the left ovary.

Conclusions. According to the results of the research work on the restoration of functional disorders of the ovaries, it has been established that the use of the progestogen hormonal stimulation scheme for cows with ovarian dysfunction is the most effective in restoring the sexual cycle. The results indicate that the introduction and widespread use of this hormonal stimulation scheme in the reproduction of highly productive dairy cattle will allow to use to the maximum of the reproductive potential of the highly productive breeding stock, including first-calf cows, which will reduce the service period. Given the low impact of the used treatment programs of follicular cysts, further research in this direction is required to increase the effectiveness of the schemes to 60 percent or more after the first course.

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ПОВЫШЕНИЕ ВОСПРОИЗВОДИТЕЛЬНОЙ СПОСОБНОСТИ МОЛОЧНОГО СКОТА

Аннотация. На основании гинекологического мониторинга 341 головы коров (268 голов симментальской породы и 73 головы красной степной породы) стада КХ «Багратион 2», проведенного с помощью ректальной диспансеризации и УЗИ-диагностики установлено, что 42 головы, или 12,3%, оказались с гипофункцией яичников, 14 голов, или 4,1%, - с кистой, 37 голов, или 10,8%, - с воспалением слизистой оболочки матки (эндометритом). Установлено, что среди гинекологических заболеваний чаще встречается у симментальской породы гипофункция (78,6%) и киста яичников (57,1%), а у красной степной - эндометриты

(51,4%) и киста яичников (42,9%). Количество животных с характерными признаками гипофункции составило всего 42 головы, что составило 12,3% от общего стада, из них при распределении по возрастным группам установлено, что 32 головы, или 76,2%, третьего отела и старше, 6 голов, или 14,3%, - второго, остальные 4 головы, или 9,5% - первого, т.е. с возрастом закономерно количество больных коров увеличивается.

В разрезе пород отмечена такая же возрастная динамика: с овариальной дисфункцией коров 3 отела и старше симментальской породы - 28 голов, или 84,9%, и 4 головы, или 44,5%, - красной степной. По коровам второго отела 4 головы, или 1,2,1%, симментальской породы, и 3 головы, или 33,3% - красной степной. По первотелкам, соответственно, 1 голова, или 3,0%, и 2 головы, или 22,2%. На основании гинекологического мониторинга были сформированы 2 группы коров: первая - контрольная (без нарушений в воспроизводительной системе), вторая - опытная (с гипофункцией яичников). Сформировано всего 82 головы в двух группах, из них в контрольной группе симментальской породы 30 голов, или 75,0%, и 10 голов, или 25,0% - красной степной. В опытной группе, соответственно, 33 головы, или 78,6%, и 9 голов, или 21,4%. При использовании первой схемы гормональной стимуляции половой охоты в опытной группе из 22 голов по окончании обработки признаки течки обнаружены у 20 голов, что в среднем составил 90,9%. При применении второй схемы половая охота из 20 голов коров опытной группы по окончании гормональной стимуляции выявлена половая охота у 17 голов, или 85,0%. Всего в результате гормональной обработки из 42 голов коров с овариальной дисфункцией половой цикл восстановился, т.е. выявлена половая охота с последующим искусственным осеменением у 37 голов, что составило 88,1%. При сравнении результатов использования двух схем гормональной стимуляции установлено, что применение CIDRa повысило фертильность коров на 5,9%. При использовании УЗИ-диагностики 28 голов (14 голов перегуляло по естественному циклу) плодотворность осеменения составила 66,7 %, так как была установлена их стельность. При использовании схемы гормональной обработки препаратом Фертагил из 23 голов животных с фолликулярной кистой при УЗИ диагностике на 10-12 сутки перед инъекцией PG F-2 α у 7 голов отмечено отсутствие в яичниках фолликулярных кист, что в соотношении составил 36,8%. При использовании препарата Сурфагон и УЗИ диагностике на 12-14 сутки перед инъекцией PG F-2 α количество коров без признаков фолликулярной кисты в яичниках составило 10 голов, или 43,5% от количества гормонально обработанных. По результатам искусственного осеменения пролеченных животных плодотворность от первого осеменения составила по группе обработанных препаратом Фертагил 42,8 % и 40 % по группе обработанных препаратом Сурфагон.

Ключевые слова: воспроизводство, восстановление нарушения репродуктивной функции, искусственное осеменение, половая охота, гормональная обработка, стимуляция суперовуляции, профилактика, лечение.

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СҮТТІ ІРІ ҚАРА МАЛЫНЫҢ ӨСІП КӨБЕЙУІН АРТТЫРУ

Аннотация. Бағратион 2 фермасының 341 сиырдың басын Семинтал тұқымы және 73 бас қызыл дала тұқымы гинекологиялық мониторингінің негізінде, ректалды тексеру және ультрадыбыстық диагностикалау әдісімен жасалған, 42 бас (12,3%) гипофункционалды деп табылған аналық безі, 14 басы немесе 4,1% - жатыр мойнының кистасы, 37 басы немесе 10,8% - жатыр мойнының қабынуымен (эндометрит) (1-сурет). Симментал тұқымдас гинекологиялық аурулардың арасында гипофункция (78,6%) және кеуде клизмасы (57,1%) арасында жиі кездеседі, ал Қызыл далада энстрометрі (51,4%) және сүт безі (42,9%) кездеседі.

Гипофункцияның тән белгілері бар жануарлардың саны тек 42 бас болды, бұл жалпы топтың 12,3% -ын құрайды, оның ішінде жас топтары бойынша бөлінген кезде 32 бас, немесе 76,2% -ы, үшінші ұрықтың және одан үлкені, 6 басы немесе 14 , 3% - екінші, қалған 4 басы немесе 9,5% - бірінші, яғни жасына байланысты

науқас сиырлардың саны көбеюде.

Тұқымдықтар бөлімінде бір жастағы серпіліс байқалды: сиырдың уылдырық бұзылуымен семинтал тұқымынан 3 бұзау және одан жоғары - 28 бас, немесе 84,9% және 4 бас немесе 44,5% - қызыл дал. Екінші ұрық сиырда Симментал тұқымының 4 басы немесе 1,2,1%, ал 3 басы немесе 33,3% - қызыл дала. Тұмса сиырлар үшін тиісінше 1 бас, немесе 3,0% және 2 бас немесе 22,2%. Гинекологиялық мониторинг негізінде сиырдың 2 тобы құрылды: бірінші - бақылаушы (репродуктивтік жүйеде бұзылуысыз), екіншісі – тәжірибелік (аналық гипофункциясы бар). Екі топта барлығы 82 бас болды, оның ішінде семинтал тұқымының бақылау тобында 30 бас немесе 75,0% және 10 бас, немесе 25,0% - қызыл дал. тәжірибелік топта тиісінше 33 бас, немесе 78,6% және 9 бас немесе 21,4%.

22 бас тәжірибелік топта жыныстық күйін гормоналды ынталандыруының бірінші схемасын қолданған кезде емдеу аяқталғаннан кейін 20 баста австриялық белгілер анықталды, бұл орташа 90,9% құрады. 17 жануарлар жыныстық күйлеуін немесе 85,0% -ды құрады. Жалпы алғанда, гормоналды емдеу нәтижесінде 42 бас сиыр функциясының бұзылуы орын алды, жыныстық цикл қалпына келтірілді. жыныстық күйлеуін анықталды, одан кейін 37 жануарлардың жасанды ұрықтандыруы 88,1% құрады.

Гормоналды ынталандырудың екі схемасын қолданудың нәтижелерін салыстыру кезінде CIDR пайдалану сиырдың бұздығын 5,9% -ға арттырды. 28 бастың ультрадыбыстық диагностикасын қолданумен (табиғи цикл бойынша қайта жүктелген 14 бас), жүктіліктің белгіленуінен бастап ұрықтандырудың құнарлығы 66,7% құрады.

Гармонмен емдеу сызбасын инъекциясына дейін 10-12 күн бұрын ультрадыбыстық диагнозымен фолликулярлы киста бар жануарлардың 23 бас жануарларынан қолданған кезде, 7 бас аналық бездердің фолликулярлық кисталарының болмауын көрсетті, бұл 36,8%. Сурфагон инъекциясына дейін 12-14 күн ішінде препарат сурфагон және ультрадыбыстық диагностиканы қолданғанда, аналық безде фолликулярлық кист белгілері жоқ сиыр саны 10 бас немесе гормондармен өңделген мөлшердің 43,5% құрады.

Жануарларды жасанды ұрықтандыру нәтижелері бойынша бірінші ұрықтандырудан алынған Фертагилмен өңделген топ үшін 42,8%, ал сурфагон мен емделген топ үшін 40% құрады.

Түйінді сөздер: репродуктивті функцияны, жасанды ұрықтандыру, жыныстық қатынастарды, гормоналды терапияны, күшейтуді ынталандыру, алдын алуды, емдеуді қайта құру, қалпына келтіру.

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REFERENCES

[1] Nezhdanov A.G., Bogdanova N.Ye. Efficiency of hormonal induction of sexual cyclicity in cows with ovarian hypofunction // Treatment, diagnosis and prevention of animal diseases, Sb. scientific papers of MBF. Volume IV. Voronezh VSAU, 2004. p. 62-69. (in Russ).

[2] Bogdanova N.E. Hormonal induction of sexual cyclicity in cows with ovarian hypofunction. Bulletin of Voronezh State Agrarian University named after K.D. Glinka - Voronezh VSAU, 2005. Volume II. p. 175-178. (in Russ).

[3] Nezhdanov A.G., Lobodin K.A., Bogdanova N.E. Restoration of fertility of cows with ovarian hypofunction //

Veterinary science. Moscow, 2007, №7. p. 20-26. (in Russ).

[4] Mikhailev V.I. Postpartum subinvolution of the uterus in cows; its morphofunctional state and the development of effective methods; therapy and prevention: Author's abstract. dis. Dr. Vet. sciences. Voronezh, 2007. p. 12-24. (in Russ).

[5] Mirzakhmetov Sh.R. The effectiveness of various methods of treatment of endometritis of cows in Tajikistan: Author's abstract. dis. Dr. Vet. sciences. Moscow, 2006. 21 p. (in Russ).

[6] Chebel, R., F. Braga, and J. Dalton. 2006. Factors affecting reproductive performance of Holstein heifers. *Animal Reproduction Science*. 101:208-224.

[7] Minina N.G., Yoshchik N.N. Comparative characteristics of indicators of the reproductive function of first-calf cows of domestic and foreign breeding in a stimulated hunt // Actual problems of intensive development of animal husbandry: a collection of scientific papers / Belarusian State Agricultural Academy ". Gorki, 2007. Vol. 10, part 2. p. 51-57. (in Russ).

[8] Degtyareva S. S. Acute postpartum endometritis of bacterial and mycotic etiology in cows and its pharmacotherapy. Abstract. diss. Cand. Vet. Sciences, Krasnodar, 2008, 21-p. (in Russ).

[9] Garbuzov A.A. Restoration of reproductive function in highly productive cows and their use as embryo donors: author's abstract of the thesis for the degree of candidate of veterinary sciences; Educational establishment "Vitebsk State Academy of Veterinary Medicine". Vitebsk, 2005. 21 p. (in Russ).

[10] Bikkulov A.S. Dynamics of progesterone in the blood and its use in combination with PMS to increase the reproductive function of cows / Author. Cand. diss. Tashkent, 1969, 20 p. (in Russ).

[11] Nezhdanov A.G., Bogdanova N.Ye. Efficiency of hormonal induction of sexual cyclicity in cows with ovarian hypofunction // Treatment, diagnosis and prevention of animal diseases. Collection of scientific papers of MBF. - Volume IV. - Voronezh: VSAU, 2004. p. 62-69. (in Russ).

[12] Minina N.G. Hormonal stimulation of the sexual function of cows // Proceedings of the conference "Modern technologies of agricultural production": 10th international scientific-practical conference. - Grodno, 2007. - p. 132-133. (in Russ).

[13] Kuzmina T.I. Prospects for the use of donor cow eggs in the latest technology of reproduction // Modern achievements and problems of biotechnology of farm animals: proceed. of the Intern. scientific conf. Dubrovitsy, 2002. p. 52–57. (in Russ).

[14] Zatsepin P.F. Physiological and energy regulation of reproduction in cows: monograph; Republican unitary enterprise "Scientific-practical center of the National Academy of Sciences of Belarus on animal husbandry". Minsk: Ecoperspectiva, 2007. 147 p. (in Russ).

[15] Kremlev Ye.P. Changes in the functional activity of the endocrine glands with the introduction of prolonged hormonal preparations: collection of scientific papers // Zootechnical science of Belarus: Collection of scientific papers. Minsk, 1997. V.33. p. 35-38. (in Russ).

[16] Lakin V.F. *Biometrics*. M., 1990. P.27-88. (in Russ).

[17] Babenkov V.Yu., Yakubets Yu.A., Babenkova L.V., Kysa I.S. Prolongation of the action of pituitary gonadotropins upon stimulation of superovulation in donor cows. // sec. biotechnology: Proc. II International scientific-practical conf. - Gorki, 2001. - p. 351-353. (in Russ).

[18] Klinsky Yu.D. The use of new gestagenic drugs *Endocrinology and zygote transplantation in farm animals*. - Moscow, 1982. - p. 210-238. (in Russ).

[19] Degtyareva S.S. Acute postpartum endometritis of bacterial and mycotic etiology in cows and its pharmacotherapy: Author's abstract. diss. Cand. vet sciences. Krasnodar, 2008, 21-p. (in Russ).

[20] Mapletoft R.J., Nasser L.F., Bo G.A. and Del Campo M.R. The effect of LH content in porcine pituitary extract on superovulatory response to a single subcutaneous injection in beefheifers // *Anim. Reprod.*, 1992, 1, P.p.237-239.

[21] Babenkov V.Yu., Yakubets Yu.A., Babenkova L.V., Kysa I.S. Prolongation of the action of pituitary gonadotropins upon stimulation of superovulation in donor cows // sec. Biotechn.: Mater. II International scientific-practical conf. Gorki, 2001. p. 351-353. (in Russ).

[22] Klinsky Yu.D. The use of new gestagenic drugs // *Endocrinology and zygote transplantation in farm animals*. Moscow, 1982. P. 210-238. (in Russ).

[23] Semenov V.G., Baimukanov D.A., Tyurin V.G., Kosyaev N.I., Mudarisov R.M., Nikitin D.A., Iskhan K Zh., Kalmagambetov M.B., Tlepov A.A. Nonspecific protection of the organism of cows-mothers and calves in realization of reproductive and productive qualities // Reports of the national academy of sciences of the Republic of Kazakhstan. Almaty. Volume 3, Number 319 (2018). Pp. 26 -38.

[24] Alentayev A.S., Baimukanov D.A., Smailov S.D., Semenov V.G., Abdrakhmanov K.T., Begaliyeva D.A., Omarov M.M. Efficiency of breeding of the alatau breed of brown cattle in the "Adal" agro-industrial company JSC // Bulletin of national academy of sciences of the Republic of Kazakhstan. ISSN 1991-3494. Volume 5, Number 375 (2018), P.p. 12-29. <https://doi.org/10.32014/2018.2518-1467.2>

[25] Spanov A.A., Bekenov D.M., Buashev K.K., Mazarzhanov B.M., Augambai K., Ilyasov M. Results of hormonal stimulation of superovulation of donor cows in the dairy direction of productivity without taking into account the sexual cycle phase // Proceedings of the international Scientific-practical conference "Livestock and fodder production: theory, practice and innovation" Almaty. 2013. p. 156 - 158. (in Russ).

[26] Alentayev A.S., Smailov S.D., Baimukanov D.A., Abdrakhmanov K.T. The productivity of the factory type "ADAL" of black-and-motley cattle of JSC "Agroindustrial Company" ADAL // J. Bulletin of the National Academy of Sciences of the Republic of Kazakhstan. September-October. №5, Almaty, 2017. pp. 125-140. (in Russ).