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ВЕСТНИК

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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COMPARATIVE STUDY OF FRUITFULNESS OF COW INSEMINATION OF A MILKING HERD AT VARIOUS LEVELS OF PRODUCTIVITY IN THE CONDITIONS OF BAYSERKE-AGRO LLP

Abstract. A comparative analysis of the fruitfulness of cow artificial insemination of milking herd at various levels of productivity was carried out in the conditions of Bayserke-Agro LLP. A study of reproduction performance of the milking herd was conducted based on the results of work performed from January 2018 to March 2019. The comparative data include cows artificially inseminated both according to the natural estrous cycle and according to the hormonal stimulation scheme of the estrus according to the Ovsynch program. It was established that the variability of the insemination index is directly dependent on the level of cow productivity, while the variability of this indicator in terms of lactation numbers has not been established.The service period and the insemination index in high productive groups significantly exceed the optimal indicators, and in groups with milk yields of 6–9 thousand kg, relatively high reproductive qualities are observed, corresponding to zootechnic norms.

Keywords: artificial insemination, insemination index, service period, estrous cycle, first-calf heifers.

Introduction. The determining factor in the dairy productivity of the herd, along with genetic potential, feeding and housing conditions, is the reproduction rate. It is known that one of the main factors determining the insemination index of cows, in addition to a balanced diet, is a certain level of productivity as well. The relationship between productivity and insemination index was revealed [1], as the milking capacity index increases above 1000, there is a significant decrease in the proportion of fecundated cows to 27.8% ($P<0.05$) while increasing the milking capacity index to 800 does not have a significant effect [2]. According to research by several authors, indicators of the reproductive function of cattle have a low coefficient of heritability, in the range of 0.1 - 0.15. Consequently, they are largely influenced by environmental factors, though their genetic causation is also in no doubt [3]. Insemination at the age of 20.0 - 21.9 months is further characterized by reduced reproductive traits as an increased seed consumption for one fruitful insemination, extended service period and low fertility rate.Whereas the insemination of mating heifers under the age of 13.9 months are distinguished by a high fertility rate and, accordingly, low seed consumption per fruitful insemination, that indicates a high reproductive trait. At the same time, the periods of productive use of animals of this group are comparably low [4, 5].

«At this stage of the dairy cattle husbandry development, which is based on the formation of dairy-commercial farms with highly productive dairy cattle based on imported animals or the use of foreign gene pool, there are problems of temporary infertility of animals after calving. The causes of obstetric and gynecological diseases are driven, first of all, by a weakening of the general resistance of the organism and a metabolic disorder.The main factor predisposing to the disease is the unbalance of the diet in terms of acid-base equivalents, minerals, and vitamins, as well as housing conditions and the level of productivity. A metabolic disorder, in turn, causes endocrine insufficiency and hormonal disorders, which leads to a disturbance in the neurohumoral regulation of sexual functions and favorable conditions are created for the development of pathogenic microflora in the genitals causing inflammation processes.» [6].

It has been established that the milk productivity of Holstein cows increases until the fifth lactation [7]. Therefore, the high lifetime productivity of cows is a consequence of the good development and functioning of all organs and systems of vital activity of the organism, including reproductive organs. In reproduction of high productive dairy cattle, it is necessary to maximize the reproductive capacity of high productive breeding stock, including first-calf heifers, that will shorten the service period.

Materials and methods of research. The research work was conducted in the dairy complex of Bayserke-Agro LLP. The main breed is Holstein cattle of Canadian breeding. In accordance with the technology, the milking herd is allocated by productivity and feeding is based on the average group productivity. Artificial insemination of cows is carried out once in 12-14 hours from the start of estrus with ordinary seed, and heifers of the mating contingent are divided by sex (homosexual).The milking herd is equipped with motion sensors, thanks to which it is possible to accurately determine the time of estrus onset. The study of pregnancy was performed on the 45-50th day after insemination with ultrasound. The number of groups of animals is 8, of which 3 groups with an average productivity from 38 to 41 kg (high-yielding, lim. 34-79 kg), 4 groups - from 23 to 27 kg (medium-yielding, lim. 21-33 kg) and 1 group is low-productive with average productivity of 14-16 kg per day. Every 14-16 days, the cows regroup according to the average milk yield data for the last 5-7 days of lactation.

Artificial insemination of heifers is carried out starting from 12 months of age upon reaching a live weight of 360 kg.

The aim of the research. Comparative analysis of fruitfulness of cow insemination of milking herd at various levels of productivity.

Research results. A comparative analysis of reproduction indicators of the milking herd was carried out based on the results of work performed from January 2018 to March 2019. The comparative data include cows artificially inseminated both according to the natural estrous cycle and according to the hormonal stimulation scheme of the estrus upon the Ovsynch program. The stimulation scheme was used for anovulatory estrous cycle, in the absence of natural estrus for more than 55 days from the time of calving, with pronounced signs of ovarian dysfunction (ovarian hypofunction) caused by lactation predominant.

As can be seen from the table, the highest rates of semen consumption per fruitful insemination were observed in the group with a productivity level of more than 11 thousand kg of milk for 305 days of lactation, which averaged 2.96 doses. Consequently, the duration of the inter-calving period was longer than the generally accepted norm by more than 100 days, which is associated with obtaining offspring from these cows one time in 16 months.Groups with average productivity of less than 8,600 kg of milk per lactation had the lowest indices of insemination, which amounted to 2.2 and the duration of the service period corresponded to zootechnic norms. It is also worth noting that the percentage of fruitful insemination in groups with a yield of more than 10 thousand kg are comparatively low and averaged from 32 to 36% in spring and summer and from 34 to 38% in autumn and winter.In groups with indicators of milk yield from 7 to 9 thousand kg per lactation, the average fertility rates during the study for pregnancy ranged from 38 to 47%, and in cows with milk yield of 6 thousand kg per lactation - not less than 54% at single insemination.

Table 1 – Comparative results of artificial insemination of cows

Number of animals	Average productivity for 305 days, kg	Seed consumption per 1 fruitful insemination, doses	Period, days	
			Service period	Inter-calvingperiod
86	11396±160.8	2.96±0.81	198±13.51	481±13.63
92	10522±150.1	2.72±0.46	192±12.8	475±12.1
98	9053±178.5	2.4±0.38	127±11.9	427±12.32
102	8620±125.3	2.2±0.36	98±10.1	379±9.81
58	7002±195	2±0.21	91±10.75	375±10.51
26	6105±203.4	1.85±0.18	80±9.35	364±8.83

Also, comparative analysis of the results of artificial insemination according to the number of lactation, listed in table 2, was carried out.

Table 2 – Variability of the insemination index of cows by lactations

Age group	n	Insemination index	Age, months
Of the first calving	72	2.4±0.42	23.6±0.26
Of the second calving	83	2.38±0.38	40.1±1.12
Of the third calving and more	45	2.3±0.35	64.7±9.5

For reliable data acquisition, only cows with milk yield from 8.5 thousand to 9.0 thousand kg were taken into account for 305 days of lactation, i.e. with average milk yield in the amount of 200 animals. Of these, first-calf heifers in the amount of 72 animals, cows of the second calving - 83 heads and the third and more calves - 45 heads.

The table shows that the age of registered cows at the time of fruitful insemination averaged 23.6 months for cows of the first calving, 40.1 months for cows of the second calving, and 62.7 months for cows of the third and more calvings. The insemination indices were identical and in the range of 2.3-2.4, the yield of offspring at the end of the year for these cows was 86% per 100 females.

In such a way, on the basis of the obtained data, it was established that the variability of the insemination index is directly dependent on the productivity level of the cows, while the variability of this indicator in terms of lactation numbers has not been established.The service period and the insemination index in high productive groups (more than 10 thousand kg of milk for 305 days of lactation) significantly exceed the optimal indicators, while in the groups with yields of 6–9 thousand kg, relatively high reproductive traits are observed, corresponding to zootechnic norms.

Foundation for research and source of funding. The program of target financing of the Ministry of Agriculture of the Republic of Kazakhstan for 2018 - 2020. URN: BR06249249-OT-18 Development of a comprehensive system to increase productivity and improve the breeding qualities of farm animals, as an example of Bayserke-Agro LLP.

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"БАЙСЕРКЕ-АГРО" ЖШС ЖАҒДАЙЫНДА ӘРТҮРЛІ ӨНІМДІЛІК ДЕҢГЕЙІНДЕГІ САУЫН ТАБЫНЫНДАҒЫ СИЫРЛАРДЫ ҰРЫҚТАНДЫРУДЫҢ ЖЕМІСТІЛІГІН САЛЫСТЫРМАЛЫ ТАЛДАУ

Аннотация. "Байсерке-Агро" ЖШС жағдайында сауын табынындағы сиырларды қолдан ұрықтандырудың өнімділігін әртүрлі деңгейлерінде салыстырмалы талдау жүргізілді. Сүт алқабының репродуктивті өнімділігін салыстырмалы талдау 2018 жылдың қаңтарынан 2019 жылдың наурызына дейін жүргізілген жұмыстардың нәтижелері бойынша жүргізілді. Салыстырмалы деректерге табиғи сексуалды циклге сәйкес жасанды түрде ұрықтандыру және «Овсинх» бағдарламасына сәйкес жыныстық циклгормоналды ынталандыру схемасына сәйкес сиырлар жатады. Ұрықтандыру индексінің өзгергіштігі сиырлардың өнімділік деңгейіне тікелей тәуелді екені анықталды, бұл ретте осы көрсеткіштің сауын мөлшері бойынша өзгергіштігі анықталмаған. Жоғары өнімді топтарда ұрықтандыру кезеңімен индексі сервисі оңтайлы көрсеткіштер дене дәуір асып түседі, ал 6-9 мың кг сауындары бар топтарда зоотехникалық нормаларға сәйкес келетін салыстырмалы түрде жоғары репродуктивті сапалар белгіленді.

Түйін сөздер: жасанды ұрықтандыру, ұрықтандыру индексі, сервис-кезең, жыныстық цикл, алғашқы тұқым.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ ПЛОДОТВОРНОСТИ ОСЕМЕНЕНИЯ КОРОВ ДОЙНОГО СТАДА ПРИ РАЗЛИЧНЫХ УРОВНЯХ ПРОДУКТИВНОСТИ В УСЛОВИЯХ ТОО «БАЙСЕРКЕ-АГРО»

Аннотация. Проведен сравнительный анализ плодотворности искусственного осеменения коров дойного стада при различных уровнях продуктивности в условиях ТОО «Байсерке-Агро». Сравнительный анализ показателей воспроизводства дойного стада был проведен по результатам работ, выполненных за период с января 2018 по март 2019 года. В сравнительные данные включены коровы как искусственно осемененные по естественному половому циклу, так и по схеме гормональной стимуляции половой охоты по программе «Овсинх». Была установлена, что изменчивость индекса осеменения находится в прямой зависимости от уровня продуктивности коров, при этом изменчивость данного показателя по количествам лактации не установлена. Сервис-период и индекс осеменения у высокопродуктивных групп значительно превышают оптимальные показатели, а у групп с надоями 6-9 тыс. кг отмечены относительно высокие репродуктивные качества, соответствующие зоотехническим нормам.

Ключевые слова: искусственное осеменение, индекс осеменения, сервис-период, половой цикл, первотелки.

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