Key words: mycobacterium, tuberculosis, mycobacteriophage, liquid and dense nutrient medium, cultures of mycobacteria.

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INFLUENCE OF FEED ADDITIVE ON EFFECTIVENESS OF INCUBATION OF EGGS OF THE BLACK AFRICAN OSTRICH

Annotation

The article presents the results of studying the egg-laying and incubation of eggs of the black African ostrich with the use of feed additives. In the experiment, females of a black African ostrich of 18 months of age were used, of which two groups of analogues of 12 individuals were formed. The daily diet of each ostrich included concentrated feed at the rate of 10 g / kg of live weight, crushed corn and corn silage 17 g / kg, alfalfa hay 20 g / kg, main food (green parts of plants) 13-20 g / kg live weight . Birds of the first group were control and took the accepted ration of feeding, ostriches of the second group additionally received the feed additive developed by us at the rate of 15 g / kg of feed. The experiment lasted for 140 days.

Key words: Ostrich egg, fidder additive, reproduction, incubator, hatchability.

Introduction

The effectiveness of breeding ostriches on farms largely depends on the level of their fertility. Increase in fertility is relevant for all bird species, even for chickens domesticated for another 4-7 thousand years before our era [1].

Ostriches, when breeding on farms in favorable conditions of feeding and keeping, lay at least 40 eggs per reproductive season [2].

So, for 20 weeks, or 140 days of the breeding season, the ostrich female can theoretically destroy 70 eggs, because it is physiologically able to lay only one egg in two days. As is known [2, 3], the process of egg formation (from ovulation to demolition) in ostriches lasts an average of two days (48 hours), while in other species of birds (chickens, turkeys, ducks, geese, etc.) only a day (an average of 24 hours). Therefore, the production of 30 eggs from 70 theoretically possible ostrich females over a 20-week breeding season (the egg-laying intensity is about 43% on average per season) should be considered a relatively good result. For example, from the geese of some heavy species, up to 20 eggs are produced in a 20-week breeding season (egg-laying rate is only 14.3%), although this species of bird is domesticated according to some estimates [3] even earlier than chickens. The ostriches, which are relatively newly domesticated (in 1864) and another half-wild bird, are used for the production of delicatessen on an industrial basis since about 1990 in the Republic of South Africa, Israel, the USA and some other countries, and since 2001 in Kazakhstan [2, 4].

For the production of hatching eggs, ostriches are used in breeding herds from 12 to 17 years [5,6]. The interval between generations in ostrich farming is 5-6 years, while in the chicken farming or in turkey breeding, for example, no more than 1 year. Therefore, not all methods and techniques used in traditional poultry farming in breeding for egg production increase are equally effective in ostrich farming, which indicates the need for their improvement or the development of new technical solutions in this special field of knowledge. It should also be noted that the duration of the reproductive season in ostriches can be up to 6-9 months (24-36 weeks) per year. According to the results of egg production, during the breeding season, the best layers for

breeding use are revealed in the next year, during the next breeding season [2]. At the same time, the estimated individuals tend to get as many offspring as possible during the next season. They are grown until puberty and are used either to form a new breeding herd, or to repair the existing one (to replace the rejected individuals). These offspring are also evaluated for egg production for a breeding season in order to select the best of them for breeding use next year.

The problem of cost-effective breeding of ostriches on farms is associated with their low fertility (both egg production and hatchability), late maturity (reaching puberty at 3-4 years of age), a short reproductive period (17-20 weeks per year), and several other factors [7].

Some authors [8] consider the low withdrawal of ostrich as the main factor in reducing fertility. For example, on farms in South Africa 56.4% of eggs are obtained from the number of incubated eggs [9], on farms in Britain - 48.5% [10], US farms - 66.0% [7], hatchability of eggs on Polish farms is 73% [2], Russia - 60% [11]. Some better results are obtained on Australian farms [12] and Israel [13], where hatchability of eggs is 67-77%. On Ukrainian farms the hatchability of ostrich eggs varies between 60-70% [8]. Some authors associate such poor results with genetic factors [14], and others - with errors in ostrich feeding, imperfection of the technique of collecting and preparing eggs for incubation [12], incubation regimes, which causes high mortality of embryos [15].

The purpose of this paper is to investigate the effect of the fodder additive on the effectiveness of the incubation of eggs of the black African ostrich

Material and methods

In the ostrich farm "Aikanat Kustary" of 24 females of black African ostrich of 18 months of age, according to the principle of analogs, two groups of 12 individuals were formed, which were kept in separate schisms.

Conditions of keeping ostriches corresponded to the requirements of domestic and foreign countries (EU countries and USA) for veterinary and sanitary rules and norms [1,5,6], providing for the provision of adult individuals with an area of at least 250 m^2 per head. During the breeding season, the ostriches were kept by families consisting of one male and two females.

The daily diet of one ostrich of the farm included concentrated fodder at the rate of 10 g / kg of live weight, crushed corn and corn silage 17 g / kg, alfalfa hay 20 g / kg, main food (green parts of plants) 13-20 g / kg live masses. Birds of the first group were control subjects and received the accepted ration of feeding, ostriches of the second group additionally received a feed additive at the rate of 15 g / kg of feed. The composition of the proposed feed additive, mass%: shell rock-38.25, bentonite-38.25, bischofite-4.5, elemental sulfur-4.0, sodium selenite-0.000004, potassium iodide-0.001, iron sulfate-0 , 01, zinc sulfate-0.001, dry brewer's yeast-2.5, dry acidophilic milk -1.5, fish meal-2.5, meat and bone meal-4.0, nettle flour-0.1, flour from roots of licorice-0.1, flour from leaves of plantain-0.1.The experiment lasted for 140 days. At the same time, daily feed intake was recorded.

Watering was done in full from semi-automatic drinkers through a centralized water supply system. The exercise was carried out according to the fattening regime of ostriches.

During the experiment to take into account the origin of the eggs, after weighing the eggs, we weighed it and inscribed the following data on the shell with a simple pencil: the date of the demolition, the weight of the egg and the name of the female with the ordinal number of the egg for the current year.

The individual egg-laying of females was taken into account for each day, every week with an accrual and in general for a breeding season lasting 20 weeks (from March 13 to July 30, 2017).

Eggs that are suitable for incubation (with a white or yellowish-white shell, with a mass ranging from 900 to 1800 grams, of regular shape, without shell defects) were stored no more than seven days after the demolition. The egg laying for incubation was carried out once a week, and they were collected daily, with each batch containing eggs, the storage period of which

ranged from one to seven days. The incubation eggs were stored in a hatchery intended for this room at a temperature ranging from 15 ° C to 18 ° C and a relative humidity of 50 to 70%. During the storage of eggs, they were rotated 90 ° at least twice a day. The first disinfection of eggs was carried out after their sorting, i.e. immediately before being sent for safekeeping. Disinfection of eggs was carried out in a gas chamber of para-formaldehyde according to established rules.

Immediately prior to laying in the incubation cabinet the trays of eggs were once again disinfected with formaldehyde vapor. Each tray with eggs was provided with a label on which the lot number, the date of the bookmark, and the number of eggs were noted. By the results of the incubation of eggs, their fertilization and hatchability were determined. The duration of the incubation of eggs was 42 days. The first viewing of the eggs was carried out on the 11th day of incubation, the second one on the 21st day, the third on the 38-39th day, i.e. when they were transferred to the output cabinet. Sampling Ostrich was conducted on the 41-42-th day from the beginning of the incubation of eggs.

Results and discussion

The reproductive capacity of laying hens is evaluated, as a rule, simultaneously by the following characteristics: egg production, fertilization and hatchability. The indices of egg production of experimental ostriches are given in Table. 1.

From the data given, it can be seen that according to the results of the first week of the reproductive season, the egg-laying of ostriches of both groups was almost identical and averaged 3.1-3.8 eggs per laying hen.

Table 1. Dynamics of egg production of ostriches

Reproductive season		Obtained eggs per layer, pcs.			
a week	date	Experienced group		Control group	
		during the week	with increasing result	during the week	with increasing result
1	13.03-19.03	3.8±0.12	3.8±0.12	3,1±0,1	3,1±0,11
2	20.03-26.03	4.1±0.11	7.9±0.01*	3.3±0.01	6.4±0.2
3	27.03-2.04	4.3±0.16	12.2±0.12	3.4±0.2	9.8±0.09*
4	3.04-9.04	2.9±0.8	15.1±0.15	2.2±0.01**	12±0.12
5	10.04-16.04	3.8±0.1	18.9±0.1	2.8±0.11	14.8±1.1
6	17.04-23.04	3.4±0.13	22.4±1.1	3.2±0.13	18±1.7
7	24.04-30.04	4.2±0.05**	26.5±1.007	3.1±0.1	21.1±0.89
8	1.05-7.05	4.4±0.1	30.9±0.8	3.8±0.09	24.9±0.12
9	8.05-14.05	3.3±0.01*	34.2±0.03	2.9±0.2	27.8±0.11
10	15.05-21.05	4.5±0.13	38.7±1.2	3.7±0.11**	31.5±0.06
11	27.05-28.05	3.7±0.11**	42.4±0.04**	3.1±0.16	34.6±0.01
12	29.05-4.06	2.9±0.9	45.3±0.13	3.8±0.01	38.4±0.19
13	5.06-11.06	2.4±0.06	47.7±0.004***	2.0±0.19	40.2±0.12
14	12.06-18.06	2.9±0.17	50.6±0.14	2.3±0.08*	42.7±0.07*
15	19.06-25.06	3.1±0.19	53.7±1.08	1.8±0.03	44.5±0.15
16	26.06-2.07	3.6±0.04*	57.3±0.19	2.9±0.11	47.4±0.19
17	3.07-9.07	1.9±0.6	59.2±0.11**	1.3±0.17	48.7±1.9
18	10.07-16.07	1.6±0.2	60.8±1.1	1.1±0.03*	49.8±1.08**
19	17.07-23.07	2.1±0.15	62.9±1.01	2.9±0.16	52.7±0.02**
20	24.07-30.07	2.6±0.03*	65.5±0.22	2.1±0.14	54.8±0.16
Note: *- P≤0,05, **- P≤0,01, ***P≤0,001					

For the first four weeks (the first month) of this season, ostriches of experimental groups received an average of 15.1 eggs per hen, and 12 eggs for control eggs. In general, over the entire observation period, lasting 20 weeks, the egg production of the experimental groups was 65.5 ± 0.22 eggs per layer, and control eggs (54.8 ± 0.16) eggs. Thus, the egg-laying of the experimental groups exceeded the control eggs by 10.7 eggs (at P <0.001).

As can be seen from the given data, a significant correlation dependence (r = 0.19-0.43) was found between the number of eggs that were laid by ostriches during the first week and in the amount of 20 weeks of the breeding season. The level of this dependence increases every 1-2 weeks of the breeding season.

Further, we conducted studies on the results of the incubation of eggs of the black African ostrich of the experimental and control group. The study group included eggs incubated from 24 females of the parent herd (Table 2).

The percentage of fertilization of ostrich eggs is lower than that of other domestic birds. In addition to the freshness and fertilization of eggs, the right storage conditions, protection against infections, timely overturning, temperature conditions, relative humidity and ventilation in the incubator are a prerequisite for incubation. Immediately prior to the laying, we conducted the transmission of eggs to find the location of the air chamber. The batch of eggs was incubated for 2 weeks, then each egg was inspected and fertilization determined. If the egg was fertilized and the embryo developed, a broad, dark red ring was visible in the region of the air chamber's boundaries. If the egg was not fertilized, then it looked the same as before you put it in the incubator. This egg has a poor view of the air chamber and there is no wide red ring in the region of the protein and air chamber boundaries. We rejected this egg.

In conditions of artificial incubation, it is necessary to keep the eggs before laying in the incubator for several days. As a result of long-term storage, the development of the embryo in the egg may not occur. The main reason for this is the death of the embryo and the development of microflora in the egg as a result of its long and improper storage. The shelf life of ostrich eggs does not exceed 5-6 days, and hatchability at the end of this period is about 50%.

To prevent the embryo from developing abnormally, the temperature of storage of eggs should be between 15-20 ° C. At the beginning of the egg laying season, the storage temperature may be somewhat higher, and by the end of the season it should decrease. Collected for 6-7 days eggs are loaded into the incubator.

The chicks should remain in the hatchery until they are completely dry and can not move on their own.

Table 2. Results of incubation of eggs of the black African ostrich

№	Indicators	Group			
		experienced		control	
		pcs /goal	%	pcs /goal	%
1	Eggs laid	50	100	50	100
2	Unfertilized	8	16	12	24
3	Blood ring	3	6	5	10
4	Frozen	2	4	2	4
5	Calfs	1	2	3	6
6	Weak and crippled	2	4	4	8
7	Healthy	34	68	24	48
	Fertilized	42	84	38	76
8	Conclusion of ostrich from fertilized	31	62	22	44
9	Preservation up to 3 months.	28	56	15	30

Analyzing the results of incubation of ostrich eggs in experimental groups, it was found that egg fertilization in the experimental group was 84%, which was 8% higher compared to the control group (76%).

It should be noted that the number of unfertilized eggs varied from 16% in the experimental group to 24% in the control group. Conclusion Ostrich for the period of the experiment in the experimental group was 62%, and was higher than in the control (44%) by 18%. Frozen embryos were found in 4% of cases in both the experimental and control groups. The blood ring in the experimental group was found in 6% of cases, whereas in the control group in 10% of cases. This is probably due to the low viability of embryos, as a result of which insufficient nutrients, macro- and microelements and vitamins in the fertilized egg could be present.

Suffociations were observed respectively in 2% of cases in the experimental and 6% in the control, which is apparently associated with insufficient feeding of embryos with oxygen.

Weak and crippled patients were 4% in the experimental and 6% in the control group. Of the 50 eggs laid in the experimental group, 34 healthy ostrich (68%) were pierced, while in the control group 24 (48%) were pierced. Preservation of ostrich patients up to 3 months of age in the control group compared with the experimental group was lower by 26%.

Thus, the use of fodder additive, balanced by protein-mineral-vitamin ststva, positively affects not only the egg production of ostriches, but also the fertilization of eggs, the withdrawal and preservation of ostriches.

Conclusions

As a result of our experiment it was found that, for the whole period of observations, lasting 20 weeks, the egg production of the experimental groups was 65.5 ± 0.22 eggs per layer, and control eggs (54.8 ± 0.16) eggs. Thus, when using the feed additive, the egg-laying capacity of the females of the experimental group was 19.5% higher than the control group. Fertility of eggs in the experimental group was 84%, which was higher by 8% compared to the control group (76%). Conclusion Ostrich for the period of the experiment in the experimental group was 62%, and was higher than in the control (44%) by 18%. Of the 50 eggs laid in the experimental group, 34 healthy ostrich (68%) were pierced, while in the control group 24 (48%) were pierced. Preservation of ostrich patients up to 3 months of age in the control group compared with the experimental group was lower by 26%. The use of fodder additive, balanced by protein-mineral-vitamin ststva, positively influences the egg-laying of ostriches, egg fertilization, withdrawal and preservation of ostriches.

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АЗЫҚТЫҚ ҚОСПАНЫҢ АФРИКАЛЫҚ ҚАРА ТҮЙЕҚҰС ЖҰМЫРТҚА ИНКУБАЦИЯСЫНЫҢ ТИІМДІЛІГІНЕ ӘСЕРІ

Аңдатпа

Мақалада ұсынылған азықтық қоспаның африкалық қара түйеқұстың жұмыртқалау және жұмыртқасының инкубация тиімділіне әсері жайлы нәтижесі көрсетілген. Тәжірибе жұмысына жасы 18 айлық 24 бас африкалық қара түйеқұс аналығы алынып, 12 бастан 2 топқа, тәжірибе және бақылау тобы болып жіктелді. Тәуліктік азық рационы әр басқа концентрацияланған азық 10г/кг тірі салмағына, үгітілген жүгері мен жүгері сүрлемі–17 г/кг, жоңышқа шөбі –20 г/кг, негізгі азық (өсімдіктердің жасыл бөліктері) – 13-20 г/кг тірі салмағына. Бірінші топтағы құстар бақылау тобы, бекітілген рационмен азықтандырылып, екінші топтағы құстар тәжірибе тобы, азығына азықтық қоспаның 15 г/кг тірі салмағына қосылып берілді. Тәжірибе жұмысы 140 күнге созылды.

Кілт сөздер: түйеқұс жұмыртқасы, азықтық қоспа, инкубатор, жұмыртқалау.

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ВЛИЯНИЕ КОРМОВОЙ ДОБАВКИ НА ЭФФЕКТИВНОСТЬ ИНКУБАЦИИ ЯИЦ ЧЁРНОГО АФРИКАНСКОГО СТРАУСА

Аннотация

В статье приведены результаты изучения яйценоскости и инкубации яиц чёрного африканского страуса при применений кормовых добавок. В опыте использовались самки черного африканского страуса 18-месячного возраста, из которых сформированы две группы-аналоги по 12 особей. Суточный рацион каждого страуса включал концентрированный корм из расчета 10г/кг живой массы, дробленую кукурузу и кукурузный силос – 17 г/кг, сено люцерны – 20 г/кг, основной корм (зелёные части растений) – 13-20 г/кг живой массы. Птицы первой группы были контрольными и принимали принятый рацион кормления, страусы второй группы дополнительно получали разработанную нами кормовую добавку из расчета 15 г/кг корма. Эксперимент продолжался в течение 140 дней.

Ключевые слова: Страусиное яйца, кормовая добавка, воспроизводство, инкубатор, выводимость.