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EFFICIENCY OF APPLICATION ASSESSMENT METHODOLOGY ADVANCE OSTRICH BY OVIPOSITION

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Between the number of eggs, ostriches demolished during the first 4 weeks of reproductive season and for the whole season, a high correlation (r = 0,68-0,71) are revealed.

It was established that this was the basis for the revision of the methodology of the evaluation and selection of ostriches with their breeding to increase oviposition. That the application of the new methodology provides a reduction of the interval between generations for 1 year, so the pace of breeding to increase oviposition increases by 1 egg in a generation is shown.

Reproductive season, the effect of selection, correlation coefficient, selection differential, ostriches, rate selection, oviposition.

Use of ostriches to produce delicacy meat on the industrial base was started not long ago, approximately since 1990, in Republic of South Africa (RSA), Israel, the USA, some EU countries, and since 2003 – in Ukraine [3,4]. That's why they are not bred heavy breeds, specialized lines and crosses of ostriches and existing breeding stocks are heterogeneous because of contrariety of thoughts concerning selection features, including laying capacity [7]. In our previous researches we have determined the main features while ostrich selection for increasing reproduxibility capacity [5,6]. They were also found essential differences between ostriches of black-necked and blue-necked subspecies according to their weight, laying capacity and some other features of reproduxibility [2].

To produce hatching eggs, ostriches are used in breeding stocks from 12 to 17 years [1,3,9,10]. The interval between generations in ostrich breeding is 5-6 years, while in chicken farming and turkey farming – not more than one year.

That's why not all methods and techniques used in traditional poultry farming while selection for laying capacity increase are the same effective in ostrich breeding. This indicates the necessity either of their improvement or finding new technological solutions.

Breeding season for ostriches can last until 6-9 months (24-36 weeks). Subsequent to the results of laying capacity during this season they determine the best laying ostriches for breeding purposes for the next year, i.e. during the next reproduction season [3]. During the next season they try to get as much decedents as it possible. They are grown till age of puberty and are used either for forming the new breeding stock or for replacement of the existing one (for changing throw-outs). In any case, these decedents are also evaluated according to their laying capacity during breeding season in order to select the best ones for breeding purposes during the next breeding season. This process is repeated with every new generation of birds during several years till achieving the planned level of laying capacity of the stock. Herewith, decedents meant for replacement or forming the new stock are got from ostriches valuated according to laying capacity only during the next reproduction season. This traditional methodology of evaluation and selection of ostriches according to laying capacity has essential fault which lies in irrational wasting of time for signification of the most productive animals in a stock for further getting descendants from them. In particular, the process of signification of the most productive animals in a stock takes up to 24-36 weeks, that's why getting descendants from them becomes possible only next year as starts the next reproduction season, which is not earlier than in a year (52 weeks). Therefore, every mentioned stage of selection process using traditional methodology of evaluation and selection of the best animals in a stock takes not less than two years (reproduction season of the first year → signification of the animals with high laying capacity; reproduction season of the second year → getting descendants from them).

The aim of the work is to develop the new methodology of evaluation and selection of ostriches while selection for laying capacity increase which will

provide acceleration of the selection process.

MATERIALS AND METHODOLOGY OF RESEARCHES. Researches were carried out in 2012 using ostriches of black-necked (50 females) and blue-necked (25 females) subspecies of a breeding stock at an ostrich farm belonging to PrJSC “Agro-Soyuz”.

Conditions of ostrich husbandry corresponded to state and foreign (EU countries and the USA) veterinary-sanitary norms [1,3,9,10], which foresee providing of adult animals with an area of not less than 250 m² per one animal. During the reproduction season ostriches were kept in families consisted of one male and 1-2 females. Ostriches were fed with rations consisted of medic haylage, maize silage and concentrates. Concentrated feed included grain components, presscake or meal (sunflower or soya), set of vitamins and micronutrients. Due to component set ration was not changed during the year. Just on the period of reproduction season the norm of feeding was increased up to 4-5 kg per 1 animal/day, of which – up to 1.0-1.5 kg of concentrates. In terms of dry matter, black-necked ostriches were fed with 2.5 kg, and blue-necked – with 3.0 kg of feed containing 8.5-9.5 mJ of available energy in 1 kg, 16-17% of crude protein and not more than 14% of crude fiber which requires state recommendations on norming of poultry feeding. The water which meets requirements of all-Union State Standard 2874 was provided in amount of not less than 4 liters for 1 ostrich per day.

It was considered the individual laying capacity of females for every day, every week with running total and for the reproduction season in a whole, which lasted for 14 weeks (from 16 of April till the 25 of July). Due to results of this consideration it was selected the best laying females for breeding purposes. Besides, it was determined interconnection between laying capacity of ostriches for the concrete period of production period and for the season in a whole. It was estimated the level of selection differential, effect and tempo of selection [8]. In particular, selection differential was calculated by formula:

$$Sd = M_g - Mo \quad (1)$$

where: Sd – selection differential;

M_g – average laying capacity of animals selected for breeding purposes;

M_o – average laying capacity in a stock for a whole.

Selection effect was calculated by the formula:

$$SE = Sd \times h^2 \qquad (2)$$

where: SE – selection effect;

Sd – selection differential;

h^2 – coefficient of feature heredity.

Selection temp was calculated by the formula:

$$Sej = (Sd \times h^2) / t \qquad (3)$$

where: Sd – selection differential;

h^2 – coefficient of feature heredity;

t – interval between generations.

RESEARCH RESULTS AND DISCUSSION. Laying ability of test ostriches is shown in table 1.

1. Dynamics of ostrich laying ability

Reproduction season		Got eggs per laying animal, units			
week	date	black-necked ostriches		blue-necked ostriches	
		for week	with running total	for week	with running total
1	16.04−24.04	3.3±0.22	3.3±0.22	3.4±0.19	3.4±0.19
2	25.04−01.05	3.0±0.19	6.3±0.37	2.9±0.16	6.3±0.59
3	02.05−08.05	2.6±0.19	8.9±0.51	3.1±0.14	9.4±0.77
4	09.05−15.05	2.9±0.21	11.8±0.67	2.5±0.19	11.9±0.95
5	16.05−22.05	2.4±0.18	14.2±0.76	2.3±0.16	14.2±1.03
6	23.05−29.05	2.6±0.20	16.8±0.87	2.1±0.22	16.3±1.17
7	30.05−05.06	1.8±0.17	18.6±0.97	1.7±0.18	18.0±1.25
8	06.06−12.06	2.4±0.18	21.0±1.01	1.4±0.24	19.4±1.36
9	13.06−19.06	2.6±0.18	23.6±1.03	1.8±0.20	21.2±1.47
10	20.06−26.06	1.6±0.15	25.2±1.08	1.3±0.18	22.5±1.51
11	27.06−03.07	2.1±0.21	27.3±1.13	1.6±0.18	24.1±1.56
12	04.07−10.07	1.3±0.15	28.6±1.13	1.4±0.16	25.5±1.56
13	11.07−17.07	1.9±0.19	30.5±1.20	1.1±0.23	26.6±1.60
14	18.07−25.07	2.3±0.21	32.8±0.32	1.8±0.23	28.4±1.27

After the given data it is obvious that following the results of the first week of reproduction season laying capacity of ostriches of black-necked and blue-necked subspecies was almost the same and equaled in average 3.3-3.4 eggs per

one laying female. For the first 4 weeks (1st month) of that season there were got in average 11.8 eggs per laying ostrich from the black-necked subspecies and 11.6 eggs – from blue-necked subspecies.

In the bulk, for the whole research period which lasted 14 weeks, laying ability of black-necked ostriches was 32.8±1.27 eggs per laying female, and of blue-necked ones – 28.4±0.32 eggs. Thus, according to laying ability black-necked ostriches excelled blue-necked ones by 4.4eggs (under $p<0.001$).

Correlation between number of laid eggs for certain period of reproduction season and for the whole period is shown in table 2. As it shows, there is correlation between the number of eggs laid by ostriches during the first week and in a sum for 14 weeks of reproduction season (r=0.39-0.51). The level of this correlation dependence increases every 1-2 weeks of reproduction season.

Correlation coefficient (r) between the number of eggs laid by ostriches during the first two weeks and for the reproduction period in a whole equals 0.45-0.62, during the first three weeks – 0.52-0.71, four weeks – 0.68-0.71, five weeks – 0.72-0.75, six weeks – 0.77-0.79. Hereafter, the level of this correlation continues growing.

2. Correlation between the number of eggs laid by ostriches during the certain period of reproduction season and for the season in a whole

Number of eggs (correlated features between each other) laid during		Correlation coefficient, *(r)*	
whole season	season period	black-necked ostriches	blue-necked ostriches
14 weeks	the first week	0.51±0.11	0.39±0.18
	two weeks	0.62±0.10	0.45±0.17
	three weeks	0.71±0.09	0.52±0.17
	four weeks	0.71±0.09	0.68±0.14
	five weeks	0.75±0.08	0.72±0.14
	six weeks	0.77±0.08	0.79±0.12

	seven weeks	0.81±0.08	0.84±0.11
	eight weeks	0.86±0.07	0.88±0.09
	nine weeks	0.89±0.07	0.91±0.08
	ten weeks	0.91±0.06	0.94±0.07
	eleven weeks	0.91±0.05	0.95±0.06
	twelve weeks	0.96±0.04	0.96±0.05
	thirteen weeks	0.97±0.03	0.98±0.04

However, the level of this dependence in a range between 0.68-0.71 we consider as sufficient for achieving objective of this research. First, this level is quite high. Secondly, while selection of ostriches for breeding purposes, due to their laying capacity results during the first 4 weeks of reproduction season electioneer has enough time (10 weeks) to get the minimal necessary amount of descendants. In particular, from each female evaluated and selected as selection nucleus of a stock for ten weeks of reproduction season it is possible to get 16-21 eggs (table 1) or not less than 8-10 young ostriches, and from each male – twice more. Besides, if it is necessary to get bigger number of descendants, reproduction season for ostriches selected for selection nucleus can be prolonged up to 24-36 weeks.

In table 3 it is shown the forecast of selection process for increasing laying capacity of ostriches while use of new and traditional methodologies of evaluation and selection of ostriches due to their laying ability. Selection performance, as it is known [8], depends on three main factors – the level of selection differential, interval between generations and level of characteristic inheritance. The level of selection differential is determined due to difference between average laying ability of females selected for breeding purposes and average laying ability of the whole ostrich stock. Parameters of selection differential while evaluation and selection of ostriches due to laying ability for breeding season in a whole and for the first four weeks remains at the same level. In particular, average laying capacity of black-necked ostriches selected for breeding purposes by traditional and new methodologies was 49.0 eggs/animal for reproduction season, and in a whole for a stock – 32.8 eggs/animal. (Selection differential equals 49.0-32.8=16.2 eggs/animal).

For population of blue-necked ostriches selection differential regardless of selection methodology equals 12.6 eggs/animal (41.0-28.4=12.6). Coefficient of laying capacity heredity of poultry equals 0.3 [8]. That's why selection effect determined by above-mentioned formula (2) remains unchanged while use of any methodology.

3. Progress of selection process in ostrich stock

Indices	Selection methodology			
	black-necked ostriches		blue-necked ostriches	
	traditional	new	traditional	new
Selection differential due to laying capacity, egg units	16.2	16.2	12.6	12.6
Selection effect, egg units	4.9	4.9	3.8	3.8
Interval between generations, years	6	5	6	5
Selection tempo, egg units	0.8	1. 0	0.6	0.8

While selection of ostriches due to results of a whole reproduction season the interval between generations in ostrich breeding equals 6 years, but while selection due to laying ability for the first 4 weeks of reproduction season – is reduced by 1 year and equals 5 years. Thanks to that, selection tempo of black-necked ostriches determined by the above-mentioned formula (3) while using traditional methodology of evaluation and selection equals 0.8 eggs/year, new one – 1.0 eggs/year, which is higher by 0.2 eggs per year. For blue-necked ostriches selection tempo while selection due laying capacity for the first 4 weeks of reproduction season also became 0.2 eggs/year higher per year when compared to evaluation and selection due to results of a whole season.

CONCLUSIONS. It is proposed the new methodology of evaluation and selection of ostriches while their selection for laying capacity increase, which provides decrease of the interval between generations by one year and increase of selection tempo by 0.2 eggs per year. Positive effect of new approach is achieved according to preliminary evaluation and selection of best ostriches according to their laying ability (for the first 4 weeks of reproduction season) to get descendants from them during 10 weeks of the same reproduction season. In the case of use of

the new methodology it is provided the acceleration of selection process for increase of laying ability of ostriches by 0.2 eggs or by 1egg for every generation.

REFERENSES

1. Горбанчук Я. О. Страусы / Я. О. Горбанчук. − К. : Kempa Center Украина, 2003. – 232 с.
2. Осадча Ю. В. Обґрунтування критеріїв оцінки та відбору страусів для племінного використання за фізико-морфологічними ознаками інкубаційних яєць : автореф. дис. на здобуття наук. ступеня канд. с.-г. наук / І. Я. Новосад. – К., 2011. – 20 с.
3. Разведение страусов в Украине / [Терещенко А. В., Тагиров М. Т., Дуюнов Э. А. и др.]. – Борки : Институт птицеводства УААН, 2008. – 136 с.
4. Сахацький М. І. Біологічні особливості, історія одомашнювання та перспективи розведення в Україні страусів ему і нанду / М. І. Сахацький // Сучасне птахівництво. – 2007. – № 10–11 (59–60) – С. 26–33.
5. Сахацький М. І. Підвищення відтворювальної здатності страусів / М. І. Сахацький, Ю. П. Кучинська // Науково-технічний бюлетень / Інститут тваринництва УААН. – Х., 2008. – Вип. 97. – С. 295–308.
6. Сахацький М. І. Екстер'єрні особливості страусів двох популяцій / М. І. Сахацький, Ю. П. Кучинська // Науковий вісник Національного університету біоресурсів і природокористування України / редкол. : Д. О. Мельничук (відп. ред.) та ін. – 2009. – Вип. 138. – С. 175–183.
7. Сахацький М. І. Перспективні напрями селекції на підвищення м'ясної продуктивності страусів / М. І. Сахацький, Ю. В. Осадча // Біологія тварин (науково-теоретичний журнал). – 2012. – Т. 14. – № 1–2. – С. 46–54.
8. Селекція сільськогосподарських тварин / [Ю. Ф. Мельник, В. П. Коваленко, А. М. Угнівенко та ін.] / за заг. ред. Ю. Ф. Мельника, В. П. Коваленка та А. М. Угнівенка. – К. : Інтас, 2008. – 445 с. : 28 іл.
9. Kreibich A. Ostrich farm management / A. Kreibich, M. Sommer. – Landwirtschaft-Verlag GmbH. Münster-Hiltrup, 1995. – 92 p.
10. The Ratite Encyclopedia. Ostrich. Emu: Rhea Ratite Records / [Editor Claire Drenowatz]. – Incorporated San Antonio, Texas, 1995. – 475 p.