

Effect of Region and Stocking Density on Performance of Farm Ostriches

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Abstract:

Although it has only a few more than one decade passed from industrial production of ostriches in Iran, but within this short period it has developed considerably. Currently chicken sale, is the most amount of producers of this bird around the country and therefore reproductive qualifications are noticeable more than other traits for the experts of this occupation. In this research, statistics related to some productive qualifications gained from 52 farms which were distributed over the country under the effect of treatment include: climate of the region and space of rearing specified for breeders flock, was statistically studied and compared. In treatment group of climate of the region, though a significant difference ($P < 0.05$) was not observed in egg production, egg weight, fertility, hatchability and weight of chick-day-old among three climates include hot and dry, mild and humid, and alpine, but totally, alpine climate had a weaker performance toward the other two climates; meanwhile, mild and humid climate was significantly ($P < 0.05$) better in maturity age of males and females and also duration of egg production season. In treatment group, space of rearing specified to breeders flock, a meaningful difference was not observed in egg production, hatchability, maturity age of males and females and also duration of egg production season, but in traits such as weights of egg and chick-day-old, the area more than 300 m^2 showed less performance toward the area of $100\text{-}300 \text{ m}^2$ and less than 100 m^2 and in fertility, area less than 100 m^2 had a less performance in comparison with the other two groups. ($P < 0.05$). The results of this research showed that the ostrich has a better performance in hot and dry and mild and humid climates as compared to alpine climates; and for the space of rearing, allocation of $100\text{-}300 \text{ m}^2$ area per each breeder bird regarding reproductive qualifications is better than more or less areas.

Key words: Ostrich, region, density, Performance

Introduction:

Fast increase in Iran population has caused a perpetual need for increment of food resources, specially protein products and diversification of them. On the other hand, subject of level of fat and cholesterol of food resources and difference of price of protein products, has increased per capita consumption of chicken regularly, so that, per capita consumption of chicken in Iran that was 13.6 Kg in 2001, it reached 18.1 Kg in 2005 (Table 1) and probably it has passed 20 Kg now. Also industrial breeding of birds like turkey and ostrich has been started in response to this need and is increasing rapidly.

According to the available documents, ostrich production in Iran is ancient. For example, in 128 BC corresponding to the Time of 2nd Mehrdad, Ashkani King, among gifts which had been sent from Iran to the emperor of China, there had been some ostrich eggs and embellished egg shell, or in excavation in suburb of Fars and Kerman (south and eastern south of the country), a large number of ceramics with flourish of ostrich and egg shell have been discovered which apparently were used as the water container and bowl; and however there is no historical well-documented reasons about existence of farming ostriches in Iran, but it is obvious that there were ostriches in Iran at that period and people, specifically riches used its products.

Table 1: Protein products consumption (kg per capita) in Iran between 2001- 2005 (from statistic center of Iran 2008)

Year	2001	2002	2003	2004	2005
product					
Red meat	12.0	12.0	11.8	12.3	11.5
Chick meat	13.6	14.3	16.6	17.3	18.1
Egg	8.6	8.3	9.0	9.6	10.5
Milk	89.7	90.3	97.0	101.3	106.0
Honey	0.4	0.4	0.4	0.4	0.5
fish	5.0	5.3	6.1	6.7	7.03

Commercial breeding of ostrich in Iran began by importing 8 breeder bird from Netherlands and 7 three months chicks from the South Africa in 1999. Until March 2001 there were only two farms for rearing this bird in the country, but number of them reached 7 farms in 2001 and more than 150 farms in 2005(8) . Now it might has reached more than 350 farms (unfortunately there is no official statistics in this regard). These farms are distributed in all regions and climates of the country, but it seems that they are mostly located in hot and dry climates. Adaptation of this bird to the different climate conditions of the country, existence of skilled experts in veterinary and animal husbandry, active industries related to animal husbandry such as animal food factories, industrial butcheries, manufacturers of incubators special for different types of birds, tannery workshops and production industries of animals and birds and close communicating and exchange of data among producers of this bird, are the most important factors of this rapid development.

Currently, because of high rate of demands for chick-day-old which itself is a result of rapid development of this industry in the state and the neighbor countries, breeding farms act mostly in the field of breeder birds for production of fertility egg and chick-day-old and fattening for offer the meat of this bird has not been much developed yet. Therefore, the most important qualifications which are necessary for breeders of this bird in Iran are including reproductive qualifications specially amount of egg production, weight of egg, percentage of fertility and hatchability, weight of chick-day-old, sex maturity age of males and females and also duration of annual egg-laying as the qualifications effective

on rate of profit in the above farms. In relation to performance of these qualifications, there is no specified standard along the country and even around the world (14) and in different resources which often have been written on the basis of personal experiences, there are a wide range of digits in expression of performance of reproductive qualifications of ostriches (Table 5) and in this regard, only World Ostrich Association (W.O.A.) has announced some benchmark targets (Table 2). The purpose of this paper is to study the performance of reproductive qualifications of ostriches existing in Iran, considering the climate of the region and the space allocated to flock as two criteria for comparison of performances and also comparison to benchmarks of World Ostrich Association (W.O.A.).

Table 2- W.O.A benchmark performance targets (2008)

	Flock age	5 yrs	8 yrs	10 yrs
Trait				
Eggs production per hen (Number)		>65	>70	>80
Eggs set (%)		>95%	>95%	>95%
Eggs Fertile (%)		>90%	>95%	>95%
Hatched (% of Eggs set)		>85%	>90%	>90%
Day old chicks (Number per hen)		>52	>60	>68

Materials and Methods

In this study, first it identified those farms that were ready to cooperate in offering required statistics; Number of these farms was 70. Then by referring to them, statistics related to performance of reproductive qualifications which were registered in form of average of flock, were gathered and therefore, average of each farm about any qualification, was considered as a record and got analyzed under effects of treatments include region climate and space allocated to the flock and in statistical comparisons by SPSS software. In primary studies, it became clear that records belong to 18 farms have many differences with information of other farms that the reason is being too young, defect in recording and registration of statistics or other cases; these records got omitted and records belong to the remained 52 farms that their distribution in hot and dry, mild and humid and alpine climates respectively were 28, 14 and 10, and in treatment group, the space allocated to breeder flock (m² for each breeder) including <100 m², 100-300 m² and > 300 m² respectively, 12, 24 and 16 farms, were studied. In this research it was intended to evaluate the effect of farm manager education level on performance of the above-mentioned traits, but by collecting data and information, it became obvious that among 70 farms under study, 66 farms (94.3%) had directors with academic educations and therefore, there was no need for this study. Qualifications studied in this paper included rate of egg production for each female breeder (quantity in year), average weight of produced eggs, percentage of fertility and hatchability, average weight of chick-day-old, sex maturity age of males and females and duration of annual egg production.

Results and Discussion:

1- Effects of climate of the region on reproductive performance:

As it is shown in Table 3, though rate of egg production in three studied climates had no significant difference (P<0.05) but in alpine climate, egg production was considerably less than two other

climates. The reason for not being significant this difference can be almost high diversity of gained statistics out of various farms in each group and if this assumption is correct, it shows lack of adequate adaptation of this bird with alpine climate. In case of weight of produced eggs, a significant difference ($P<0.05$) was not seen in three studied climates, however, average weight of eggs in alpine climate was more than others, which probably it was because of comparative coolness in this climate (1). In fertility, hatchability and weight of chick-day-old qualifications, a significant difference ($P<0.05$) was not observed, but comparative high weight of chick-day-old in mild and humid climate that was seen in spite of low weight of eggs, probably was as a result of high relative humidity and therefore its effect on chicken hatchery processes. Sex maturity age of males and females in mild and humid climate was significantly ($P<0.01$) less than two other climates which probably was a result of adequate temperature and less difference of temperatures in day and night during the year in this climate. As this process within the annual egg production season was seen ($P<0.01$), means that the highest performance was belong to mild and humid.

Table 3- Average performance of reproductive traits in studied climates

Traits	Climate	Hot and dry	mild and humid	Alpine	Standard error (S.E)
Annual Egg production (Number per hen)		48.8 ^a	50.7 ^a	43.5 ^a	2.937
Egg Weight (gr)		1410 ^a	1420 ^a	1450 ^a	28.586
Egg Laid Fertility (%)		83.4 ^a	82.1 ^a	84.4 ^a	0.926
Egg Laid hatchability (%)		48.2 ^a	47.6 ^a	47 ^a	1.691
Chick day old Weight		920 ^a	935 ^a	925 ^a	9.389
Sex maturity age of males(month)		34 ^a	32 ^b	35 ^a	0.388
Sex maturity age of females(month)		25 ^a	23 ^b	26 ^a	0.328
Annual Egg production term(day)		225 ^b	245 ^a	220 ^b	2.423
Number of studied farms		28	14	10	

2- Effect of Breeding Space on Reproductive Performance:

As it is shown in Table 4, there is no significant difference between average of egg production, hatchability, egg production, maturity age of males and females and duration of annual egg production season ($P<0.05$). However, in case of rate of egg production, the least digit belonged to spaces less than 100 m² that shows a remarkable difference in compare to the other two treatments. Here, probably it is possible to attribute the reason for not being significant of this difference to high diversity of the gained data out of different farms in each group, and anyway it expresses the negative impact of space limitation on egg production of ostriches. Weight of produced eggs decreased parallel to increment of space of breeding so that in spaces more than 300 m² it was significantly less than the other two groups ($P<0.05$) which it could be out of more motions of the bird in wider areas and higher energy consumption during the day. Fertility of eggs inverse of egg weight increased parallel with increment of space, while space less than 100 m² had significantly ($P<0.05$) the least rate of fertility which can be occurred by negative impact of space limitation on natural and sexual activities of the bird. Weight of chick-day-old normally is correlated to weight of eggs and here this relation was seen either, so that space more than 300 m² like weight of egg had significantly ($P<0.05$) the least weight.

Table (4)- Average performance of reproductive traits with separation of spaces allocated to breeders flock.

Traits	Space allocated to breeders (m ² per breeder) <100m ²	100-300m ²	>300m ²	Standard error (S.E)
Annual Egg production (Number per hen)	39.2 ^a	52.7 ^a	48.5 ^a	1.637
Egg Weiht(gr)	1520 ^a	1480 ^a	1273 ^b	24.057
Egg Laid Fertility	74.3 ^b	85.8 ^a	86.1 ^a	1.262
Egg Laid hatchability	48.2 ^a	47.9 ^a	47.3 ^a	0.766
Chick day old Weigt	940 ^a	930 ^a	900 ^b	3.834
Sex maturity age of males(mounth)	34 ^d	33 ^a	34 ^a	0.524
Sex maturity age of females(mounth)	24.5 ^a	24 ^a	23.5 ^a	0.422
Annual Egg production term(day)	231 ^a	238 ^a	239 ^a	2.046
Number of studied farms	12	24	16	

Investigation on grand total average performance of studied qualifications:

Table 5 shows the grand total average of reproductive qualifications in total studied farms and also range of digits published in books and papers. Since a standard digit for performance of ostrich has not been published yet, scientific comparison of performance of available farms in other countries is not possible but comparison of the above digits with range of the offered digits indicates that performance of reproductive qualifications of ostrich in Iran does not have much difference with other spots around the world. But comparison of these digits with benchmark targets of W.O.A (Table 2) shows that ostrich breeding industry in Iran is still far from the goals of this association. Of course investigation on raw statistics gained from studied farms in this research showed that among from 52 farms participated in data collection, digits of performance of 13 farms that is 25% of total, is adapted with the benchmark targets of W.O.A. and this means that genetics and management potential required for reaching the above-mentioned benchmark targets, is prepared in the country.

Table (5)— Grand total average performance of productive qualifications in studied farms and range of digits published in books and papers.

Traits	Total average of studied farms	Range of published digits
Annual Egg production (Number per hen)	48.29	40-55
Egg Weiht(gr)	1423.08	900-2000
Egg Laid Fertility	83.24	80-90
Egg Laid hatchability	47.81	40-63
Chick day old Weigt	925.00	700-900
Sex maturity age of males(mounth)	33.65	24-36
Sex maturity age of females(mounth)	24.65	18-30
Annual Egg production term(day)	229.42	200-210
Number of studied farms	52	-

Conclusion and Suggestion:

The results of this research totally showed that performance of reproductive qualifications in ostriches in hot and dry and mild and humid climates in Iran, is better than alpine climate; and also space of 100-300 m² in respect of less and more space, generally had a better performance. Also, study on raw statistics gained from this research showed that there is much diversity in performance of this bird in different farms regardless from impacts of studied treatments that could indicate existence of pretty high genetics diversity and therefore preparation of adequate conditions for genetic improvement of this bird. So, for the first step, appropriate information transmission to breeders in direction to cull low-produced birds of the flock and allocation of their chickens merely to fattening and expression of long-term economic profits are suggested; and meanwhile, for prevention of increase inbreeding, programs such as occasional change of male ostriches among farms and occasional importation of over-produced male ostriches from abroad and other methods for genetics improvement, by the good of government and offering facilities required for appropriate promotion of these programs. For the next step which can be done parallel to the first step, comprehensive plan of statistics and registration of records of ostrich production farms are executed in the country and ostrich breeding station is to prepare accessibility to benchmark targets of W.O.A.

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