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GROWTH AND DEVELOPMENT OF YOUNG REPLACEMENT DUCKS OF THE LOCAL POPULATION DEPENDING ON THE STOCKING DENSITY WITH CO-REARING IN THE CONDITIONS OF NORTHERN KAZAKHSTAN

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Stocking density is one of the important factor in the rearing system, and is a key element influencing performance, behavior and health of birds [1]. Low stocking densities are associated with animal welfare and poultry product quality, although this comes at the expense of less meat and therefore may result in economic losses [2]. On the contrary, with a high stocking density, higher economic returns can be obtained as the number of birds per unit of space increases. However, this can come at the cost of reduction of bird performance, health and activity level[3].

As a result of several factors such as high ambient temperatures, insufficient air exchange, increased ammonia levels, and poor access to feed and water, high stocking densities can have negative results on the performance of birds [4]. The effects of high stocking densities on broilers have been reviewed and negative effects have included reduced final weight body, feed intake and feed conversion, a higher incidence of scratches, bruising was noticed [5].

In addition, the negative consequences of high stocking density included an increased level of physiological and oxidative stress and a decrease in locomotor activity.

Carcass yield, feather growth and carcass quality are particularly important economic characteristics for waterfowl production. Good feathering is considered a critical factor in modern meat production due to the demands for high quality carcasses. Poor plumage increases spoilage and lower quality at slaughter due to scratches and pecks that can lead to skin damage; it can also reduce the amount of down produced, thus leading to economic losses.

Many previous studies of broiler have shown that in the high stocking density group feathering performance was low [6]. Although there have been many studies of assessment of the effect of stocking density on broiler performance, information on stocking density for duck production is very limited.

A stocking density of more than 8 birds/m² negatively affects the growth rates of Peking ducks aged 21 to 42 days, and it was recommended to adjust the stocking density of Peking ducks to 5–8 birds/m² [7]. The maximum stocking density for growing Peking ducks reared in pens with plastic wire flooring is 8 heads/m² to achieve improved growth and carcass performance. These results indicated that more than 8 ducks/m² Peking ducks in the growth phase can be considered as high stocking density. Male Peking ducks showed optimal body weight gain at 8 birds/m² until 4 weeks of age and at 4 birds/m² before slaughter at 10 weeks of age, regardless of floor pens or cages. In his study, breast and leg meat yield also decreased when stocking density increased to 8 birds/m². Studies on the effect of stocking density (7, 9 and 11 male ducks/m²) on the behavior, welfare, performance and carcass quality of Muscovy ducks have found that a stocking density of 9 birds/m² gives the best results. Maximum stocking densities at the end of the fattening period were reported for Muscovy, Mule and Peking ducks, respectively, but stocking densities for the starter period were not available. Because the genetic selection of ducks has been constantly evolving, modern ducks may have higher growth rates and higher carcass yield than before. Therefore, the purpose of our research was to determine the rational parameters of the stocking density of replacement young animals in modern conditions [8].

The experiment was carried out on ducks of the “BishkulskayaColored” cross at the Bishkulskaya Poultry Farm LLP in the conditions of Northern Kazakhstan. For the experiment of day old ducklings of the same weight were formed 4 groups: one control group and 3 experimental groups with co-rearing, where the sex ratio was 1:1.

Every week the ducks were weighed to determine gain in body weight. Bird mortality was recorded daily during the experimental period.

Ducklings were kept for 49 days on a deep litter. Indoor lighting was continuous and the temperature was maintained at 33°C from 1 to 3 days of age, then gradually reduced to about 25°C until 14 days of age, and then maintained at about 16-22°C. Feeders and drinkers were installed in each paddock. All ducklings had free access to water and food. During the experimental period, all ducks were reared on diets.

Results.

Preservation of ducklings. The main indicator characterizing the viability of poultry in the conditions of industrial production of poultry products using intensive rearing technologies is the safety of the livestock in the herd. (Table 1).

Table 1– Preservation of livestock of replacement young animals

Component	Control group	1 experimental group	2 experimental group	3 experimental group
Preservation, %	97,7	98,0	98,4	98,8

In our study, increasing stocking density did not significantly affect the overall mortality of ducks from hatching to 21 days of age or from 21 to 49 days of age [8].

Meat performance of replacement young animals. In the study, increasing stocking density had a negative effect on the growth and development of ducks. With an increase in stocking density live weight decreases. The obtained data on growth and development are presented in tables 2.

Table 2 – Live weight of replacement young animals

Component	Control group (20/ 10/ 7 Birds/m ²)	1 experimental group(18/ 9/ 6 Birds/m ²)	2experimental group(16/ 8/ 5 Birds/m ²)	3 experimental group(14/ 7/ 4 Birds/m ²)
Days				
1	55,59±0,7	55,6±0,7	55,61±0,8	55,6±1,1
7	207,65±22,8	219±19,4	227,75±23,9	231,1±23,7
21	859,4±9,91	879,5±10,14	896,2±11,07	912±12,36
35	1712,85±21,72	1741,45±20,09	1789,55±19,91	1808,75±19,99
49	2682,4±19,16	2727,3±25,07	2784,2±24,35	2828,3±22,1

The 3rd experimental group (14 head/m², 7 head/m² and 4 head/m²) had a high live weight during the entire growing period; after transplantation (the second growing period), the live weight in this group exceeded by 15.8 g; 32.5 g and 52.6 g, in the third period of the experiment, the live weight was higher by 19.2 g; 67.3 g and 95.9 g, and at the end of the experiment, the live weight of ducklings was 2828.30 g, which is 44.10 g; 101.0 g. and 145.90 g. more than in the rest of the group at the end of the period.

This study showed that body weight and weight gain of ducks decreased with increasing stocking density. These results were confirmed by the findings of other researchers about ducks. Ducks reared at a stocking density of 4 birds/m² at 36 to 49 days of age have the highest live weight and body weight gain than at a stocking density of 7 birds/m² at 36 to 49 days of age, which confirms our findings. On the contrary, the planting density did not affect the final live weight in experiment of other authors.

In our study, a high stocking density negatively affects the growth performance of ducks, with a stocking density of 10 birds/m² at the age of 21 to 35 days, 7 birds/m² at the age of 36 to 49 days, respectively. Similar results were obtained by other authors and they recommended adjusting the stocking density of ducks to 8-7 birds/m² at the age of 21 to 35 days, 4-6 birds/m² at the age of 36 to 49 days, respectively.

With a high stocking density, body weight and body weight gain decrease, which can be associated with many factors: 1. a decrease in the area for each bird leads to high-temperature stress of the bird 2. Insufficient air exchange [7], 3. High

ammonia content in the room, 4 Decreased palatability of the diet and drinking water.

In our study, the final live weight of replacement young animals at 7 weeks of age ranged from 2682.4 to 2828.3. Similar results for the final body weight of ducks were obtained by other authors [3,4]. In terms of chemical composition, the diet of all groups was identical throughout the entire experiment, thus, in our study, differences in absolute gain, final live weight may indicate the effect of stocking density on these criteria. In our study, the highest daily gains are observed in ducklings aged 7 to 35 days, other authors report the highest daily gains in ducks aged 28 to 42 days.

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