

**Scottish International Conference on Multidisciplinary Research and
Innovation – SICMRI 2025**

UO‘K: 619:598.6:617:3

**FEATURES OF CHANGE IN POSTNATAL ONTOGENESIS OF FINGER BONE
MORPHOMETRIC INDICATORS OF JAPANESE QUAILS**

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Annotation: The features of changes in the morphometric dimensions of the bones of the fingers of Japanese quails with and without probiotic application were studied in postnatal ontogenesis. Absolute indicators of finger bone length Japanese quails receiving probiotics have been found to increase rapidly up to 15 days of postnatal ontogenesis, while in a group without probiotic application, this process occurs at 25 days; it has been noted that the absolute index of finger bone weight increases in one measure from the first day of postnatal development to 60 days, slows down this process at 120 and 294 days, and is higher in the probiotic applied group than in the non-probiotic; the growth factor of the absolute index of finger bones has been observed to be higher in the group with probiotic administration up to 294 days of postnatal ontogenesis than in the group with no probiotic intake.

Keywords: Japanese quails, finger bones, probiotic, postnatal ontogenesis, length, weight, growth coefficient, morphometric, absolute indicator.

Introduction. In the rapid development of the livestock sector, great attention is being paid to the poultry industry. Farms engaged in domesticated quail farming are developing steadily. In the effective use of quails, it is important to identify their biological characteristics, in particular, the morphofunction changes observed in their organs during the various physiological stages of postnatal ontogenesis, as well as to develop scientifically based recommendations.

The physiological characteristics of Japanese quails make it decisive to keep them in conditions of intensive technology and get a high yield. The presence of body temperature 41-42os ensures an accelerated course of metabolism, and due to this, Birds effectively fight diseases and infectious factors called by pathogenic microorganisms. Such a heat regime not only protects against infection, but also accelerates the growth of young chicks, and this ensures that the egg-laying process begins somewhat earlier than in other types of poultry [2]. Studies have found that the peak egg-laying stage of Japanese quails is 3-6 months of age, meaning that during this period, female quails give up to 300 eggs in a year. The authors argue that maintaining high productivity requires compliance with optimal feeding and storage conditions, monitoring the biological characteristics of the species, and these can affect the quality of the egg product as well as the duration of egg laying [6].

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The organs and systems of Japanese quails develop in postembryonic ontogenesis in certain stages and are similar to those of other bird species. In the early stages of growth, the rapid development of the digestive and respiratory systems occurs, and this is due to their high metabolic activity. As quails mature, they experience an increase in body weight, linear dimensions, and the formation of specialized organ structures [1].

In connection with the increase in the functional load during the period of egg donation and active growth in the process of growth and development, significant changes occur in the organs of the digestive and reproductive systems of quails. The digestive system, in particular the development of the pancreas, is particularly shaky in the early ages in relation to the effectiveness of the absorption of nutrients [5].

The beginning of laying eggs in female Japanese quails often occurs at 35-40 days of age, and in this they weigh up to 100 grams. This period of physiological maturation allows female Japanese quails to lay 8 to 10 eggs in the first month, and each egg is around 7 grams. As quails grow, egg laying increases, and it has been found that on the 60th day of their life, egg laying can reach 25 in a month, with weights ranging from 10 grams to 12 grams [3.4].

The aim was to determine the features of changes in morphometric parameters of the supporting organs of Japanese quails at different stages of postnatal ontogenesis.

Inspection methods and materials. Scientific research was conducted on Japanese quail brought from farms engaged in quail farming in the egg direction. Postnatal progress for scientific investigations 1, 7, 15, 25, 60, 120 and the shoulder bones of Japanese quails were taken, which were divided into 2 groups in the 294-day stages, that is, not probiotic, and applied. Both groups of chickens were fed the same ration. Feed and water were fed to the quails of the first control group, in addition to the food of the second experimental group, the probiotic “INNPROVET™” was added to 1 ml (3.0 x 10⁹ KHB) of 1 liter of boiling water cooled to +18+20°C for 10 days. Generally accepted morphological methods were used to obtain linear bone dimensions.

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Growth coefficient to determine the dynamics of changes in bone morphometric parameters with age K.B.Svechin developed by

$$K = \frac{V_t}{V_0} \text{ determined by the formula:}$$

K – growth coefficient;

V_t – absolute indicator of morphometric dimensions of bones of adult quails;

V₀ – The initial indicator of the morphometric dimensions of the bones.

The mathematical-statistical analysis was performed using the Student and Fisher criteria in the Microsoft Excel spreadsheet.

The results obtained and its discussion. As a result of studies, it was found that morphometric indicators of finger bones in different physiological stages of postnatal ontogenesis of Japanese quails show characteristic features of change.

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Japanese Quails with no probiotic application 1-finger I absolute indicator of the length of the phalanx bone increased rapidly from the first day of postnatal ontogenesis to the 25th day, From 0.17 ± 0.005 CM to 7 days 0.21 ± 0.004 CM ($K=1.24$; $p<0.03$, In 15 days – up to 0.45 ± 0.01 CM ($K=2.14$), in 25 days – up to 0.56 ± 0.008 CM ($K=1.24$; $p<0.02$, in later studied ages, it was noted that this size is almost constant, i.e. at 60 days – 0.57 ± 0.02 CM ($K=1.01$), at 120 days – 0.56 ± 0.01 CM ($K=0.98$), at 294 days – 0.56 ± 0.02 CM. It was found that the growth factor of the absolute indicator of the length of the 1st finger I phalanx bone increases to 3.29 times during the period from the first day of postnatal development to 294 days.

Quails without probiotic Application 1st finger I absolute indicator of the weight of the phalanx bone step by step from the first day to the 60th day of postnatal ontogenesis, like its linear dimensions, coartarization without major deviations and up to 7 days 0.0078 ± 0.0002 G to 0.0082 ± 0.0002 g ($K=1.05$), at 15 days – 0.0086 ± 0.0002 g ($K=1.05$), at 25 days – 0.011 ± 0.0002 g ($K=1.28$; $p<0.03$), at 60 days – it has been found that 0.013 ± 0.0005 G ($K=1.18$), subsequent juveniles will slow down this process, i.e. at 120 days – to 0.01 ± 0.0004 G ($K=0.76$), at 294 days – to 0.0089 ± 0.0002 G ($K=0.89$). The growth factor of the absolute index of 1st finger I phalanx bone weight was observed to reach 1.14 times from the first day to 294 days of Quail postnatal ontogenesis. Probiotic applied Japanese quails 1-finger I absolute indicator of the length of the phalanx bone slightly increased by 15 days of postnatal ontogenesis, Rise to 7 days from 0.17 ± 0.005 CM to 0.29 ± 0.006 CM ($K=1.71$; $p<0.03$), at 15 days – to 0.63 ± 0.014 CM ($K=2.17$), a significant constant of this size in later studied ages, that is, it was observed that at 25 days – 0.64 ± 0.014 CM ($K=1.01$), at 60 days – 0.66 ± 0.013 CM ($K=1.03$), at 120 days – 0.63 ± 0.014 CM ($K=0.95$), at 294 days – 0.62 ± 0.024 CM ($K=0.98$). It was noted that the growth factor of the absolute indicator of bone length in question is 3.64 times from the first day of study of Quail postnatal ontogenesis to 294 days. Japanese Quails with probiotic application have an absolute index of 1st finger I phalanx bone weight that rises in one rhythm up to 60 months of postnatal development and ranges from 0.0078 ± 0.0002 g to 0.0088 ± 0.0002 g ($K=1.12$) in 15 days- 0.011 ± 0.0002 , in 25 days – 0.013 ± 0.0005 g ($K=1.18$), it was noted that at 60 days – 0.016 ± 0.0005 G ($K=1.23$), it would decrease to 0.011 ± 0.0002 G ($K=0.68$) at 120 days and remain completely unchanged (0.011 ± 0.0002 G) at 294 days. It was observed that the growth factor of the absolute indicator of the weight of the 1st finger I phalanx bone increased up to 1.41 times.

Japanese quails that did not receive probiotics 2-finger I absolute indicator of the length of the phalanx bone increased rapidly up to 60 days of postnatal ontogenesis, Up to 7 days, 0.23 ± 0.006 CM to 0.27 ± 0.006 CM ($K=1.17$), at 15 days – 0.44 ± 0.008 CM ($K=1.63$; $p<0.03$), at 25 days – 0.74 ± 0.01 ($K=1.68$; $R<0.03$), at 60 days – 0.823 ± 0.01 CM ($K=1.11$) rise, it was noted in the later studied stages that it is almost unchanged from the younger age and is equal to 0.82 ± 0.01 CM ($K=0.99$) at 120 days, and 0.81 ± 0.016 CM ($K=0.98$) at 294 days. It was found that the growth factor of the absolute indicator of the length of the 2nd finger I phalanx bone increases up to 3.52 times during the studied stages of the postnatal development of quails. Japanese quails that do not receive probiotics have an absolute index of 2-finger I phalanx bone weight in a phased manner up to 60 days of postnatal ontogenesis and range from 0.0058 ± 0.0002 g to 0.0062 ± 0.0002 G ($K=1.07$) in 15 days – 0.0072 ± 0.002 g ($K=1.16$) in 25 days – 0.0088 ± 0.0002 G ($K=1.22$), At 60 days it was observed to increase to – 0.014 ± 0.0004 g ($K=1.59$) as well as fall to 0.011 ± 0.0002 G at 120 days, with an absolute constant of this size at 294 days. The growth factor of the absolute index of 2-finger I phalanx bone weight was found to be 1.89 times during the period from the studied 1st day to the 294th day of Quail postnatal ontogenesis.

Japanese Quails with probiotic application have an absolute size of 2-finger I phalanx bone length of 0.23 ± 0.006 CM on the initial day of postnatal development, a significant increase in this indicator up to 15 days, and an increase of 0.2 ± 0.009 CM ($K=1.82$; $p<0.03$) on the 7th day,

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an increase of this process to 0.94 ± 0.014 CM ($K=2.23$; $p<0.03$) it was observed to persist without deviations and reach -0.97 ± 0.019 CM ($K=1.03$) at 25 days, and -1.04 ± 0.028 CM ($K=1.07$) at 60 days. This indicator of bone has been recorded to drop to $-1,008 \pm 0.037$ CM ($K=0.96$) at 120 days, to -0.96 ± 0.019 CM ($K=0.95$) at 294 days. This indicator of bone has been recorded to drop to $-1,008 \pm 0.037$ CM ($K=0.96$) at 120 days, to -0.96 ± 0.019 CM ($K=0.95$) at 294 days. The growth factor of the absolute indicator of the length of the 2nd f.

Probiotic ingested Japanese quails 2-finger I absolute indicator of phalanx bone weight is 0.0058 ± 0.0002 G on the first day of postnatal development, At 7 days – up to 0.0078 ± 0.0002 g ($K=1.34$; $p<0.03$), at 15 days – up to 0.0212 ± 0.0006 g ($K=2.71$), at 25 days – up to 0.023 ± 0.0008 g ($K=1.08$), at 60 days – up to 0.026 ± 0.0008 G ($K=1.13$), and in later ages this the process was observed to slow down, i.e. at 120 days – 0.0208 ± 0.0005 G ($K=0.78$), at 294 days – 0.0206 ± 0.0004 g. It was noted that the growth factor of the absolute indicator of the weight of the 2nd finger I phalanx bone increases to 3.55 times during the period from 1 day to 294 days of postnatal ontogenesis of quails.

Conclusion:

- absolute indicators of the length of the finger bones a rapid increase in postnatal ontogenesis of Japanese quails receiving probiotics up to 15 days, in a group without probiotic application, this process is observed to occur at 25 days;
- it was noted that the absolute indicator of the weight of the finger bones of Japanese quails rises in a phased manner from the first day to the 60th day of postnatal development, a slowdown in this process at 120 and 294 days, higher in the probiotic applied group than in the non-probiotic applied;
- the growth factor of the absolute index of finger bone length and weight was found to be higher in Japanese Quails with probiotic administration from the initial day of postnatal ontogenesis to the 294th day than in a group with no probiotic intake.

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