

Some Behavioral Traits of the Japanese Quails (*Coturnix coturnix japonica*) Rearing in Cages

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Abstract: In this study, some behaviors of the Japanese quails, raised in cages, such as feeding (F), drinking (D), activation (A), lying (L), standing (S), feather pecking (FP) and aggressive pecking (AP) were observed once a week between 10:30 and 11:30 am. The behavioral observations for 20 quails were launched when the quails were 3 days of age and continued for 5 weeks. In the study, where the time-sampling method was applied, the behavioral traits observed once in every 5 min during a 4 h observation were recorded. The Japanese quails at the first 5 weeks of age displayed feeding and drinking behaviors most in the study. Activation and lying behaviors were observed at close frequencies whereas feather pecking and aggressive pecking behaviors occurred at rather low levels. The feeding behavior was observed 0.40 times more at a significant level in the 1st week than in the 5th week ($p<0.01$). The feeding behavior, which occurred at the highest level in the first week, had a descending course and was observed at the lowest level in the 5th week. It was observed that the feeding behavior in the other weeks was 0.36 times lower in the 2nd week, 0.31 times lower in the 3rd week and 0.19 times lower in the 4th week than in the 5th week. The feeding behavior was at an insignificant level between the first 3 weeks and the 2nd, 3rd and 4th weeks. It was found out that the Japanese female quails displayed feeding behavior 0.22 times more at a significant level than the male quails ($p<0.01$).

Key words: Quail, feeding, drinking, lying, aggressive pecking

INTRODUCTION

Animal behaviors can be used widely as an indication of the function of the organism besides the sufficiency of environmental conditions (Lindsay, 1996). Animal behaviors are not only influenced by the rearing system and conditions but also are important in the organization of the conditions (Barbosa *et al.*, 2005). The poultry raised in the intensive system display a rapid growth and spend a large amount of time for lying, feeding and drinking behaviors (Bizeray *et al.*, 2000; Weeks *et al.*, 2000; Zupan *et al.*, 2005). Under normal conditions, the poultry consume 2 times more water than the food they eat (Şenköylü, 2001). However, the time animals allocate for water consumption is shorter than the time they allocate for food consumption. In other words, animals spend a larger amount of time feeding (Xin *et al.*, 2002; Dinçer *et al.*, 2007). Quails display a very rapid growth during the first 3 weeks of age. In this process, they reach a live weight of approximately 6 times more than their hatching weight (Sarica *et al.*, 1995;

Jones *et al.*, 1997; Çamdeviren and Taşdelen, 2002). The live weight gains of female quails are slightly higher than those of males until the age of sexual maturity while females are obviously heavier than males after the age of sexual maturity and this difference of weight is expressed to be caused by an increase in ovaries, liver and small intestines (Vatansever, 2002).

The poultry raised outdoors can display some of the behaviors displayed by their ancestors in natural life such as activation (wandering, scratching and scabbling), standing and feather pecking more than the animals raised indoors (Krijgsveld *et al.*, 2003; Anderson *et al.*, 2004; Rind *et al.*, 2004; Moesta *et al.*, 2008). In this study, particularly the strong-looking individuals in the population have a lower rate of negatively affecting other animals and animals can move more easily. In addition, observed at a lower level among animals raised outdoors, cannibalism is regarded as an essential problem in intensive raising (Savaş and Şamlı, 2000; Odén, 2003; Newberry *et al.*, 2007; Riber *et al.*, 2007; Rodenburg *et al.*, 2008). Cannibalism is observed more frequently

particularly among the poultry raised in cages due to negative conditions in factors such as genotype, feeding conditions, stocking density, temperature, lighting duration and intensity.

The aim of this study is to examine some behavioral traits of the quails rearing in cages.

MATERIALS AND METHODS

The research was conducted with 20 Japanese quails between March and April of 2008 in the Experimental Rooms at the Department of Animal Science in the Faculty of Agriculture at Çanakkale Onsekiz Mart University. Four quails each were placed and grown in cages each with the dimensions of 40×40×40 cm. The data were obtained from 9 females and 11 males.

During the first 3 weeks, the starter feed containing 2800 kcal ME with 27-28% dry protein was used in the experiment, while between the 3rd and the 5th weeks, the grower feed containing 2600-2800 kcal ME with 24% dry protein was used. Quails were presented ad libitum feed and water. With this purpose, bird type feeder and drinker hung in the inner side of the cage were used.

Twenty three hour light and 1 h dark lighting programme was applied to the chicks in the first week and 10 h lighting programme was applied in the last 2 weeks.

Some behaviors of the Japanese quails in cages such as feeding (F), drinking (D), activation (A), lying (L), standing (S), feather pecking (FP) and aggressive pecking (AP) were observed once a week between 10:30 and 11:30 am. In the study, where the Time-Sampling method was applied, the behavioral traits observed once in every 5 min during a 1 h observation were recorded (Bessei, 1980). The behavioral observations were launched when the quails were 3 days of age and continued for 5 weeks.

The data of the behavioral traits obtained from the Japanese quails were prepared in SAS (1999) statistical package program by means of PROC GENMOD according to the GEE method. In the model, the observation day and the gender of quails were considered as constant environmental factors. Since, the observation day×sexual interaction was found to be statistically insignificant in all the models formed for each behavior, it was omitted from the model. During the Post-hoc analyses, the Wald Chi-square comparative test was used.

RESULTS AND DISCUSSION

As it is observed (Table 1), quails displayed feeding and drinking behaviors most. These findings are in compliance with the results of the study by Bizeray *et al.*

(2000), Weeks *et al.* (2000) and Zupan *et al.* (2005) where they report that the poultry raised intensively spend a large amount of time feeding, drinking and lying. While, the behaviors of activation and lying were observed to be at close frequencies in the study, the feather pecking and aggressive pecking behaviors were rather low. The findings of this study are different from the studies by Savaş and Şamlı (2000), Odén (2003), Newberry *et al.* (2007), Riber *et al.* (2007) and Rodenburg *et al.* (2008) where they reported that cannibalism cases increased in parallel to the increase in aggressive pecking in intensive raising. These results show that the factors that cause aggressive pecking such as genotype, feeding conditions, stocking density, temperature, illumination duration and intensity have been taken under control. Moreover, it can be stated that the quails, which spend a significant amount of time by feeding activity did not tend to display aggressive behaviors during this period.

It was found that the Japanese quails differentiate statistically in terms of feeding and standing behaviors according to genders (p<0.01). It was observed that female quails displayed a higher level of feeding behavior than males whereas male quails displayed the standing behavior more than the females (Table 2). These results are in full compliance with the reports by Sarıca *et al.* (1995), Jones *et al.* (1997), Çamdeviren and Taşdelen (2002) and Vatanserver (2002). Quails display a very rapid growth during the first 3 weeks and in this period, they spend a large amount of time feeding or consuming food and they gain a high rate of live weight. In the study, the occurrence frequencies of all the other behaviors were

Table 1: Phenotypic means (\bar{x}) and standard deviation (S.D.) values of behavioral traits

Behaviour traits	$\bar{x} \pm S.D.$
Feeding	0.30±0.45
Drinking	0.20±0.40
Activation	0.17±0.38
Lying	0.17±0.37
Standing	0.11±0.31
Feather pecking	0.02±0.14
Aggressive pecking	0.02±0.14

Table 2: Phenotypic means (\bar{x}) and standard deviation (S.D.) values of the behavioral traits according to genders and their significance levels (P)

Behaviour traits	Female	Male
	$\bar{x} \pm S.D.$	$\bar{x} \pm S.D.$
Feeding	0.32±0.46a	0.28±0.45b
Drinking	0.19±0.39	0.19±0.39
Activation	0.17±0.37	0.17±0.38
Lying	0.17±0.38	0.16±0.37
Standing	0.09±0.29a	0.12±0.33b
Feather pecking	0.02±0.15	0.01±0.13
Aggressive pecking	0.01±0.12	0.02±0.15

The difference between the means highlighted by different letters in the same line is statistically significant (p<0.01)

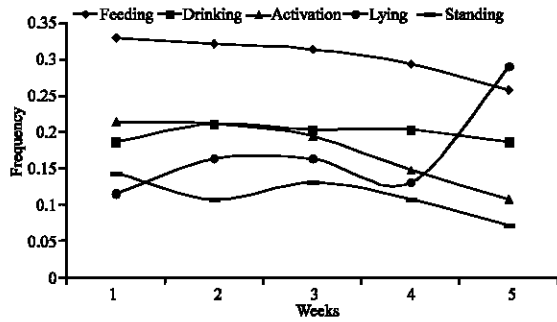


Fig. 1: The variation of some behavioral traits observed in the Japanese quails according to weeks

quite close to each other. While, classifying the growth periods in animals in the studies they carried out on quails of same race, Camcı and Erensayın (2004) stated that the rapid growth period was composed of the 0th-3rd weeks.

It was found out that the variations of the behaviors other than the drinking behavior, among the behaviors observed in the (Fig. 1), according to the observation day were statistically significant ($p < 0.01$). As it is seen, the drinking behavior, one of the feeding behaviors, did not differ according to weeks whereas the feeding behavior displayed a similar tendency in the first 3 weeks and began to decline afterwards. Şenköylü (2001) reported that the poultry consumed 2 times more water than the food they ate under normal conditions. Besides this, Xin *et al.* (2002) and Dinçer *et al.* (2007) reported that the time allocated by the poultry for water consumption was shorter than the time they allocated for food consumption and that, therefore, animals spent a larger amount of time feeding. It is observed that the reports of these researchers and the behavioral traits of the Japanese quails observed in the study are in full compliance with each other. The breaking point in the 3rd week in the feeding behavior is seen in the activation behavior. The activation behavior was maintained in the same way until the 3rd week; however, it began to decline after this week. The occurrence frequency of the lying behavior increased from the first week until the 3rd week and it began to decrease in the 4th week; however, it began to have a sharp increase afterwards. Due to their high growth rates in the first weeks, the quails displayed the lying behavior less. Particularly after the 3rd week, when the growth rate began to decrease, the quails stayed away from feeding and increased their lying tendency. The standing behavior generally had a stable course throughout the study whereas it began to decrease after the 3rd week.

When the odds (Ψ) ratios are considered, the feeding behavior has a continuously descending tendency as the weeks pass. The feeding behavior was observed 0.40

Table 3: The regression coefficient (b), standard error (SE), odds ratio (Ψ) and significance levels (P) of the feeding behavior according to the observation day and genders

Factor		b	SE	Ψ
Observation day (weeks)	1	0.34	0.06	1.40a
	2	0.31	0.09	1.36ab
	3	0.27	0.06	1.31ab
	4	0.17	0.06	1.19b
	5	0.00	0.00	1.00c
Gender	Female	0.20	0.03	1.22a
	Male	0.00	0.00	1.00b

The difference between the means highlighted by different letters in the same column is statistically significant ($p < 0.01$)

times more at a significant level in the 1st week than in the 5th week ($p < 0.01$). The feeding behavior, which occurred at the highest level in the 1st week, had a descending course and was seen at the lowest level in the 5th week. The feeding behavior of the other weeks was observed 0.36 times less in the 2nd week, 0.31 times less in the 3rd week and 0.19 times less in the 4th week than in the 5th week. The feeding behavior occurred at an insignificant level between the first 3 weeks and the 2nd, 3rd and 4th weeks. It was determined that the Japanese female quails displayed the feeding behavior 0.22 times more at a significant level than the male quails ($p < 0.01$; Table 3).

The growth rate of the quails increased until the 3rd week whereas it had a descending course after the 3rd week. During the period of growth, the female quails gain a slightly higher live weight than the male quails. This difference of live weight between females and males is influenced by the increases in the weights of ovaries, small intestines and liver of females (Vatansever, 2002). Differences of live weight between both genders become fairly obvious as of the 5th week when the females reach sexual maturity. Thus, it is observed that quails allocate more time for food consumption during this period and tend to gain more live weight. In parallel to the decrease in their live weight gains, a tendency of decrease is observed also in their feeding behaviors after the 3rd week. We can state that the growth trend of the Japanese quails during the first weeks is observed clearly by means of the behavioral observations.

CONCLUSION

The Japanese quails at the growth period displayed the feeding and drinking behaviors most. In the study, the activation and lying behaviors were observed at close frequencies whereas feather pecking and aggressive pecking behaviors occurred at rather low levels. It is observed that the female quails displayed feeding behavior more and gained more live weight than the males during the period of growth. The male quails, however, were observed to display the lying behavior more than the females.

In conclusion, it was found out that the Japanese quails raised in cages spend a large amount of time by feeding, drinking and lying behaviors.

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