SOME BEHAVIORAL TRAITS OF THE JAPANESE QUAILS REARING IN DIFFERENT AIR TEMPERATURES

*Kim Khang Thi NGUYEN¹, Thao Nguyen NGUYEN², Mong Diem Thi TO³, Minh Suong Thi NGO⁴, Masashi TAKAHASHI⁵, Hanako BAI⁶

¹ Associate. Professor, College of Agriculture, Can Tho University (3/2 street, Xuan Khanh ward, Nink Kieu district, Can Tho city, Viet Nam) E-mail:ntkkhang@ctu.edu.vn
² Doctor, College of Agriculture, Can Tho University (3/2 street, Xuan Khanh ward, Nink Kieu district, Can Tho city, Viet Nam) E-mail:nguyenthaonguyen@ctu.edu.vn
³ Master student, College of Agriculture, Can Tho University (3/2 street, Xuan Khanh ward, Nink Kieu district, Can Tho city, Viet Nam) E-mail:tothimongdiem@thptvinhhai.edu.vn
⁴ Doctor, College of Agriculture, Can Tho University, Viet Nam (3/2 street, Xuan Khanh ward, Nink Kieu district, Can Tho city, Viet Nam) E-mail: ntmsuong@ctu.edu.vn
⁵ Professor, Dept. of Animal Science, Hokkaido University (Kita9 Nishi9, Kita-ku, Sapporo, Hokkaido, 060-8589, Japan) E-mail: mmasashi@anim.agr.hokudai.ac.jp
⁶ Associate. Professor, Dept. of Animal Science, Hokkaido University (Kita9 Nishi9, Kita-ku, Sapporo, Hokkaido, 060-8589, Japan) E-mail: hbai@anim.agr.hokudai.ac.jp

This study aimed to evaluate the behavioral changes of Japanese quail under different temperature conditions. The experiment was carried on 36 days-old, 240 Japanese quails that were reared under three different temperature levels: (1) severe (38°C), (2) near comfort zone (25°C), and (3) ambient temperature (TA-30°C). Each treatment consisted of 80 quails, one male and one female in each cage. The following behavioral traits were recorded in each treatment: (1) eating, (2) drinking, (3) aggressive activity, e.g., feather pecking, (4) other activities (quiet, resting, and no movement) for 10 seconds at 10 am, 12 pm, and 2 pm. The experiment lasted four days.

The results showed that the Japanese quails displayed all observed behaviors in the different temperature conditions. The highest number of birds showed behaviors related to being quiet, resting, and no movement. There was a statistically significant difference in feeding behavior among the different temperature levels after 4 hours of measurements. The highest percentage of quails showed eating activity at ambient temperature treatment, whereas severe temperature recorded the lowest percentage of quails exhibiting this activity (p < 0.05). The percentage of quails showing drinking activity was the lowest at near comfort zone temperature and the highest at severe temperature (p < 0.05). The percentage of birds with aggressive activity was the highest in near comfort zone temperature (p = 0.058).

Key Words: Japanese quails, eat, drink, aggressive, feather pecking

1. INTRODUCTION

Japanese quails (Coturnix coturnix japonica) were first imported to Vietnam by the National Institute of Animal Husbandry in April 1997 to meet the Mekong Delta’s enormous market demands, i.e., the Ben Tre, Tien Giang, and Tra Vinh provinces. Japanese quails reproduce rapidly and their rate of egg production is remarkable. They are robust, disease-resistant, and easy to keep, requiring only simple cages and equipment with little space. Quail birds are highly adaptable to hot and humid
conditions in the Mekong Delta.

The comfortable temperature for quail breeding, especially for laying quails, is of fundamental importance because low or high temperatures may compromise their behavior and reproductive performance\(^2\). High environmental temperatures may negatively affect the well-being and performance of laying birds\(^3\) and change their behaviors, such as reduced feed consumption and a tendency to remain prostrated with wings open to dissipate body heat to the environment\(^4\).

The thermal comfort zone for good egg production of quails ranges from 5°C to 30°C\(^5\). Sousa et al.\(^6\) reported that optimal temperatures for adult quails should range between 23°C–26°C. According to El-Tarabany\(^3\), the comfortable temperature for laying quail is around 23.8°C.

There is a need for a better understanding of quail’s behavioral responses to the environment, especially in the laying period. The understanding will help control the effect of heat stress under the impacts of climate change. Hence, new studies related to the environmental adaption are necessary.

2. MATERIALS AND METHODS

The experiment was conducted on 36-days-old 240 male and female quails randomly distributed in three climatic chambers corresponding to three different temperature levels climatic chamber 1 (severe temperature-38°C), climatic chamber 2 (near comfort zone temperature 25°C), and climatic chamber 3 (ambient temperature TA-30°C). Each treatment had 80 quail birds raised in cages, with two birds in each cage (a male and a female). Temperature (°C) and humidity (%) unit were recorded daily at 6:30 am and 1:30 pm at the two measuring positions, such as the top and bottom of the house, and the average value of the two measurement positions was calculated. All experimental quails were fed mixed feed with a nutritional value of 20% CP and ME 2750 kcal/kg. Drinking water was provided freely by an automatic drinking trough system. The cages’ daily activities were recorded by observing the activities (for 10 seconds at 10 am, 12 pm, and 2 pm; described in Table 1 and counting the number of birds performing each activity in different cages.

| Category | Behavior          | Description                                                                 |
|----------|-------------------|-----------------------------------------------------------------------------|
| 1        | Eat               | Head directed into the feeder, eating                                       |
| 2        | Drink             | Drinking at drinker/pecking at the drinker                                 |
| 3        | Aggressive or     | Investigate feathers, feather pecking jumping, be aggressive, shaking       |
|          | Others            | No movement, bird standing still, bristle                                    |

The behavior data were analyzed to compare the statistical differences among treatments using the Minitab 16.0 software. The statistical test “One-Way Anova” was performed to compare the behaviors among the different temperatures. The Tukey’s test was used to separate treatment averages. The differences in the percentage of birds exhibiting different behaviors among the treatments were analyzed using the chi-square test. All statistical tests were carried at a 5% level of significance.

3. RESULTS AND DISCUSSION

The average temperature and relative humidity in each treatment are presented in Table 2. Thermal treatments were 33.42°C, 27.75°C, and 36.56°C in the ambient, near comfort zone, and severe temperature climate chambers, respectively. Relative humidity ranged from 60.06% to 69.64%. All observed temperatures were higher than the comfort zone temperature of 23.8°C reported by El-Tarabany\(^3\).

| Treatments | Mean ± SE |
|------------|-----------|
| 30°C       | 33.42 ± 0.14 |
|            | Humidity (%) 66.26 ± 0.39 |
| 25°C       | 27.75 ± 0.14 |
|            | Humidity (%) 69.64 ± 0.39 |
| 38°C       | 36.56 ± 0.14 |
|            | Humidity (%) 60.06 ± 0.39 |
In Fig. 1, it is shown that all the behaviors were recorded in each treatment. The behavior of the birds changed in the different evaluation periods. Most quails displayed the last category of behavior (no movement, standing, being still, and bristle) \((p < 0.05)\) in all the treatments.

As shown in Table 3, the percentage of active laying quails after 4 hours of measurement was significantly different among different treatments on the second day. The percentage of birds exhibiting eating behavior was lowest in the severe temperature \((38^\circ C)\) climate chamber, whereas the percentage of birds exhibiting eating behavior was highest of the three treatments in the ambient temperature \((25^\circ C)\) climate chamber \((p < 0.05)\). Likewise, the ambient temperature climate chamber \((25^\circ C)\) had the lowest percentage of quails drinking water, with severe temperature having the highest percent of quails drinking water \((p < 0.05)\). At low temperatures, it would be expected that birds would increase food intake to increase metabolic heat production and water consumption reduction compared with other animals\(^7\). Compared with other thermal treatments on the first day, the percentage of quails exhibiting aggressive behavior was the highest in the comfort zone temperature category \((p = 0.058)\). This fact was also demonstrated by Medeiros et al.\(^8\), who reported that in environments when the air temperature increased from 26°C to 36°C and the relative humidity increased from 34% to 76%, the environment became increasingly unpleasant for birds due to thermal stress.

### 4. CONCLUSION

At severe temperatures \((38^\circ C)\), the quail birds exhibited drinking behavior the most and eating behavior the least. In contrast, at near comfort zone temperatures \((25^\circ C)\), the quail exhibited the most feathering and fighting activities and the least drinking activity.

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