

# Influence of seaweed tea on laying performance of Japanese Quail (*Coturnix japonica*) during hot season

JR A. Mantog<sup>1</sup>

<sup>1</sup> Faculty, Agribusiness Management Department, Davao Oriental State University-Cateel Extension Campus, Philippines

## ABSTRACT

*This study examined the influence of seaweed tea supplementation in the laying performance of Japanese quails (*Coturnix japonica*) under a high temperature environment. Eighteen (18) ready to lay Japanese quail approximately 40 day-olds, acquired from a quail commercial farm in Davao City randomly laid in 9 cages (16 inches x 14 inches x 14 inches) with 2 birds in each cage. The result showed that seaweed tea supplementation (50ml/L) for 4 weeks significantly increased ( $p < 0.05$ ) egg production percentage, number of lay eggs and improved egg weight of Japanese quails during the hot season ( $\geq 35^{\circ}\text{C}$ ) in Cateel (August-September). Therefore, it can be recommended that the supplementation of 50ml seaweed tea/liter of water can be considered as an effective protective practice to reduce the harmful impact of heat stress in poultry management.*

**Keyword:** - Heat stress, Japanese quail, laying performance, seaweed tea

## 1. INTRODUCTION

The temperature is considered as one of the factors that contribute to the lower productivity and profitability of poultry industry, particularly during the hot season. Poultry birds that are unprotected during the hot season are likely to experience an imbalance of thermal condition or disturbed physiological processes which may contribute to the rate of respiration, reduction in physical activity. Moreover, it also affects the feed consumption of the birds, feed efficiency, egg production, and egg weight and shell quality. All of these physical changes and significant effect effects on poultry production parameters usually result in significant loss of economic advantage in the poultry industry.

One of the issues of the poultry industry particularly in the Philippines is how to fight for the negative effects of heat stress on the poultry industry during hot season months. Other farms are venturing in the cool system and other poultry raisers made some changes in their production practices like providing clean and cool drinking water, limit the number of birds per cage and provide feeding during the cooler times of the day, however, according to Al-Batshan[1], this possibly would not enough for farmers to achieve its outcome in production like improving the egg quality. Further, the construction of the ventilation system requires enough and adequate funds. Likewise, those farmers producing an egg in the backyard scale in different regions of the Philippines are not interested in increasing more budgets for possible expenses to combat the effect of heat stress; therefore manipulation in the dietary supplement for poultry is another strategy that requires a lower cost.

Research of Brownlee, Fairclough, Hall and Paxman, [2] showed that seaweeds also have different kinds of unique phytochemicals not available in other plants that are scientifically proven to combat heat stress especially during biological, biochemical and enzymatic processes.

It has been, to our knowledge, no experiment carried out in laying quails supplemented with Seaweed Tea during the hot season. Hence, it is significant that the roles of additional supplementation of vitamins and even minerals during

summer months be given attention to achieve them for maximum production and good business undertaking as recommended by Caurez and Olo, [3].

Thus, this experimental study was done to evaluate the influence of seaweeds tea supplementation in the laying performance of Japanese laying quails subjected to high temperature in terms of:

- a. Number of Lay Eggs;
- b. % Egg Production; and
- c. Egg Weight.

## 2. MATERIALS AND METHODS

### 2.1 Experimental Animals

This study used eighteen (18) ready to lay Japanese quail (*Coturnix japonica*) approximately 40 day-olds, acquired from a quail commercial farm in Davao City randomly laid in 9 cages (16 inches x 14 inches x 14 inches) with 2 quails in each cage. Quails were given commercial feeds, conditions and raised under standard poultry management procedures. Experimental location and birdcages were cleaned and disinfected one week before the expected arrival of the layers' experimental quails.



Figure 1 Experimental birds in a 9 battery experimental cages

### 2.2 Experimental Design and Dietary Treatment

After conditioning, quail layers were fed with a commercially available quail laying mash with approximately 20% crude protein in an ad libitum feeding. At 65% laying productivity, quails are firstly weighed, assigned into nine (9) cages and assigned to 3 treatments (Seaweed Extract) supplementation. Each cage was provided with drinking troughs and feeders. The temperature and relative humidity were regularly monitored and recorded using a minimum-maximum Thermo hygrometer. Supplementary treatment groupings were composed of two levels of seaweed extract T1 as Control, T2 as 30ml/L of water, T3 as 50ml/L of water. The laying quails were fed 3 times a day whereas water was given ad libitum. Experimental quail layers were similarly and randomly scattered to three (3) treatments using the completely randomized design and every treatment was replicated in three (3) times with two (2) quails as replicate in every cage.

### 2.3 Data Collection Method

Laying performance variables (% egg production, No. of Laid Eggs and Egg Weight) were determined following standardized procedures. Furthermore, data obtained were used to determine the laying performance of quail layers.

### 2.4 Statistical Analysis

The data gathered were analyzed using the Statistical Tool for Agricultural Research (STAR) with the main effects of seaweed tea supplement and its interaction between variables. Differences between treatment means were compared using the Least Significant Difference (LSD) Test.

### 3. RESULTS AND DISCUSSION

#### 3.1 Laying Performance Variables

No. of lay eggs was significantly influenced ( $p=0.0053$ ) by seaweed tea supplementation with the control group during the hot season (August-September) for 4 weeks with ( $\geq 35^{\circ}\text{C}$ ) temperature. In the study by Brownlee, et. al., (2012), he reported that seaweeds have unique phytochemicals that cannot be found in other plants that combat oxidative stress outside of dietary intake especially during physiological, biochemical and enzymatic processes. In this result, the supplementation of seaweed has significantly influenced the egg production of quail against heat stress. It was also validated based on the visual observation of the size, shape, and color of the quail egg. Eggs of quails supplemented with seaweed tea were bigger, uniform shell color and shape compared to the eggs of the control group (Fig.2). Seaweeds are rich in minerals such as potassium, phosphorus, calcium, chlorine, magnesium, sulfur and also trace elements fluorine cobalt, vanadium, chromium, iodine, tin, molybdenum, and nickel (Extension, 2019[4])

**Table 1** The effect of supplementation of seaweed tea on laying performance of Japanese quails

Laying Performance Parameters	p-value	0 Seaweed Tea (Control)	30ml Seaweed Tea/Litre of Water	50ml Seaweed Tea/Litre of Water	Level of Significance
No. of Laid Eggs	0.0053	13.33 <sup>b</sup>	15.33 <sup>b</sup>	18.33 <sup>a</sup>	Highly significant
% Egg Production	0.0091	65.00 <sup>b</sup>	76.67 <sup>b</sup>	91.67 <sup>a</sup>	Highly significant
Egg Weight	0.0004	122.67 <sup>c</sup>	147.00 <sup>b</sup>	182.33 <sup>a</sup>	Highly significant

**Note:** Means in the same row with the same superscripts are not significantly different; ( $p<0.05$ )

Egg production percentage in 50ml Seaweed Tea/Litre of Water was higher ( $p=0.0091$ ) than of 30ml Seaweed Tea/Litre of Water supplementation. The increase of egg production in quail is affected by the highly variable composition of seaweeds, with large differences in final content in proteins, minerals, lipids and fiber (Misurcova, 2012[5]).



**Figure 2** Variations in egg size, shape, and color of heat-stressed quail eggs

Egg weight was also significantly influenced ( $p=0.0004$ ) by the supplementation of different levels of seaweed tea. In the article of Burgin (2016)[6] in his poultry world page, the inclusion of 1-3% of green seaweed in poultry diet will significantly improve the egg production and egg quality. It is also reported to increase the weight of the egg, shell thickness, and color of the egg yolk (Burgin, 2019).

#### 4. CONCLUSIONS

Therefore, this finding indicates the assumption that supplementation of 50ml of seaweed extract diluted to 1 Litre of water may help in fighting harmful effects of heat-stressed poultry animals during months in the Philippines with the hot season. Positively, it is recommended that the complete supplementation of seaweed tea would yield a significant increase in laying performance and egg quality under areas with high temperatures. It can also be concluded that the level of supplementation increases, its significant effect also increases.

Moreover, it is recommended that further study can be done to confirm some significant results and to include all production variables like Feed Conversion Ratio and Digestion Efficiency. Further, egg quality evaluation and quail stressors should also be considered in further study.


#### 5. ACKNOWLEDGEMENT

The author would like to thank Davao Oriental State College of Science and Technology – Cateel Extension Campus unwavering support during the conduct of the study. A special thanks are also given to Mr. Reynan M. Maglimolo, for his assistance in the making of quail cages.

#### 6. REFERENCES

- [1]. Al-Batshan, H.A. (2002). Performance and heat tolerance of broilers as affected by genotype and high ambient temperature. *Asian-Aust. J. Anim Sci.*, 10:1502-1506.
- [2] Brownlee, Iain, Fairclough, Andrew, Hall, Anna And Paxman, Jenny. (2012). The potential health benefits of seaweed and seaweed extract. In: POMIN, Vitor H., (ed.) *Seaweed: ecology, nutrient composition, and medicinal uses. Marine Biology: Earth Sciences in the 21st Century.* Hauppauge, New York, Nova Science Publishers, 119- 136.
- [3] Caurez, C., & Olo, C. (2013). Laying Performance of Japanese Quail (*Coturnix Coturnix Japonica*) Supplemented with Zinc, Vitamin C and E Subjected to Long Term Heat Stress. 2013 International Conference On Agriculture And Biotechnology, 60.
- [4] Seaweed in Poultry Diets - eXtension. (2019). Retrieved 26 October 2019, from <https://articles.extension.org/pages/65717/seaweed-in-poultry-di>
- [5] Misurcova, L. (2012). Chemical composition of seaweeds. In: Kim, S.-K. (Ed.), *Handbook of Marine Microalgae: Biotechnology and Applied Phycology.* John Wiley & Sons, p. 567
- [6] Burgin, R. (2019). Benefits of seaweed in poultry diets. Retrieved 26 October 2019, from <https://www.poultryworld.net/Nutrition/Articles/2016/2/Benefits-of-seaweed-in-poultry-diets-276>

#### BIOGRAPHIES (Not Essential)

	<p>JR A. Mantog is an agribusiness management faculty at Davao Oriental State University-Cateel Extension Campus. He earned his Master in Agribusiness Management at Central Mindanao University, Musuan Bukidnon, Philippines. He is a licensed agriculturist.</p>
---	---