"POINTED-END" AND "BLUNTED-END" EGG SHAPE BIASED SEX OF JAPANESE QUAILS AT NATIONAL VETERINARY RESEARCH INSTITUTE, VOM

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Abstract
Following sex determination at about 3 to 6 weeks old in Japanese quail, several undesired growers are often culled from the convoy. Thus, it becomes pertinent to predetermine only the desired sex during egg incubation. Many techniques and ideas have been developed to identify Japanese quail sex at day old but to no avail. Therefore, this study was aimed at investigating the claims and speculations by many Nigerian traditions and beliefs that "pointed-end" and "blunted-end" eggs produce male and female hatchlings respectively in poultry species. To achieve this, a total of 1,100 Japanese quail eggs were carefully sorted and distributed based on the shape into 550 "pointed-end" eggs and 550 "blunted-end" eggs. Data were collected on incubation period, hatchability and sex ratio. In the "pointed-end" eggs, incubation period was between 17 and 18 days, hatchability was 50.7% and more cocks (207) representing 74.2% compared to only 72 hens (representing 25.8%) were recorded with a sex ratio of 1 hen: 2.9 cocks. Whereas, among the "blunted-end" eggs, chicks emerged on the 18th day of incubation, 59.5% hatchability was observed and more hens (238 representing 72.8%) relative to 89 cocks representing 27.2% were recorded with a sex ratio of 2.7 hens: 1 cock. Consequently, the claims and speculations by many Nigerian traditions and beliefs that egg shape could determine the sex of poultry species appeared to be correct. At the moment, in-depth research findings are required, to elucidate this preliminary finding before its adoption.

Keywords: Egg shape, Japanese quails, NVRI, sex determination, sex ratio.

Introduction

Japanese quail like fowls, pheasants and partridges belong to the family *Phasianoidea* of Order *Galliformes* of the Class *Aves* of the Animal Kingdom. Species or subspecies of the Genus *Coturnix* are native to all continents except the Americas. The domesticated subspecies *Coturnix coturnix japonica* was called Japanese quail also known as Common quail, Eastern quail, Asiatic quail, Stubble quail or Pharaoh's quail. Meanwhile, the correct popular nomenclature for *Coturnix coturnix japonica* was given as Japanese quail or *Coturnix* and not *Coturnix* quail because the Latin word "*Coturnix"* may be translated as quail (Fah, 2009; Howes, 1964). According to Haruna *et al*. (1997), Japanese quail (*Coturnix coturnix japonica*) was introduced into Nigeria in 1992, where it has gradually gained popularity over other poultry species. Japanese quail is believed to be a veritable source of nutrients that can satisfy human requirements for healthy living (Boni *et al*., 2010; Raji *et al*., 2015). In particular, the eggs have been reported to be rich in minerals and vitamins that could meet the recommended daily requirements of human beings irrespective of the age. Essentially, quail products have been reported to be low in fats and cholesterol contents and as such very medicinal as they help against digestive tract disorder, anaemic, diabetic and hypertensive conditions (Jean, 2009; Musa *et al*., 2007; Sati *et al*., 2012).

Since quails mature at 30 – 60 days old, weighing between 100 – 220g with potency of laying 250 – 320 eggs per year (Jean, 2009), its products would be readily available to meet human demands. It is believed

that if fertile eggs are needed in quail convoy, 1 male: 1 or 2 female(s) ratio should be maintained and quail egg fertility may continue for up to 14 days even when the male is withdrawn from the convoy (Woodward *et al*., 1973). The quest for fertile egg production has resulted in undue pressure on quail chicks demand and supply but sexing at day old is impossible. Although, Fah (2009) reported that quail sex identification is possible at 3 weeks of age using plumage pattern, it requires reaffirmation at 6 weeks old. Unfortunately, there is little or no reliable information on quail chick sexing at day old, even with the Japanese vent examination hi-tech facilities and the sex-linked colour auto-sexing recently developed. Many Nigerian traditions and beliefs have it that "pointed-end" and "blunted-end" eggs produce male and female hatchlings respectively in poultry species. Thus, this study was targeted at investigating the influence of egg shape on Japanese quails sex.

Materials and methods

The study was conducted at the National Veterinary Research Institute (NVRI), Vom, Jos. Jos is a city in Plateau State in the Middle Belt of Nigeria located on latitude 9° 55' 42.56"N and longitude 8° 53' 31.63"E. The altitude is about 1,264.5m (4,148.62 Feet) above sea level with about 1,400mm (55 inches) of rainfall annually. Average monthly temperatures of 21 – 25°C (70 – 77°F) and hailstones sometimes fall during the rainy season because of the cooler temperature at high altitude (Wikipedia, 2018). A total of 1,100 Japanese quail eggs were collected from a convoy at the peak of lay in the Breeding Unit, Poultry Division NVRI. The eggs were carefully sorted and distributed based on the shape into 550 "pointed-end" eggs and 550 "blunted-end" eggs (See plates 1 and 2).

Plate 1: "Pointed-end eggs"

Plate 2: "Blunted-end eggs"

All the eggs were incubated in 8 clutches in an automated incubator, regulated at 38°C with relative humidity set appropriately at 60 – 70% depending on the incubation day. Incubation period represented the time between egg incubation and chick emergence, hatchability was determined by dividing the number of hatched chicks with the number of incubated eggs and death of the birds was recorded as mortality. At 3 weeks old, sex of the birds was identified using breast plumage and at 6 weeks old, the identified sex was reaffirmed using breast plumage. Cocks population relative to the hens represented the sex ratio. The data collected were analysed using simple descriptive statistics as prescribed by Adesoye (2006).

Results and discussion

Table 1 shows the effect of "pointed-end" egg shape on hatchability and sex ratio in Japanese quails. The incubation period of 17 – 18 days was in consonant with the reports of Romao *et al*. (2009). The hatchability value was relatively lower than 69.6 – 72.7% reported by Farghly *et al*. (2015) in Japanese quail except in the 5th and 7th egg clutch where 66% and 76% were recorded. This could be largely due to infertility level of the eggs incubated and partly due to bias selection of the eggs used in the study. More cocks (207) representing 74.2% were recorded in all the egg clutches incubated. This probably indicated that "pointed-end" egg shape may influence Japanese quail sex. More importantly, the sex ratio was biased to more cocks in the convoy, suggesting that the excess cocks could be slaughtered for meat production. Though mortality

was apparently higher (41) in cocks compared to 36 in hens, it was recorded in both sexes. Therefore, "pointed-end" or blunted egg shape may not determine survivability rate in Japanese quail.

Table 1: Influence of "pointed-end" egg shape on hatchability and sex ratio in Japanese quails

Parameters		Egg clutches incubated								
		1	2	3	4	5	6	7	8	Grand total
No. of eggs incubated		100	100	100	50	50	50	50	50	550
Incubation period		18	17	18	18	18	17	17	18	-
No. of hatched eggs		43	51	50	22	33	20	38	22	279
Hatchability (%)		43	51	50	44	66	40	76	44	50.7
No. of hens		14	13	14	6	7	5	10	3	72 (25.8%*)
No. of cocks		29	38	36	16	26	15	28	19	207 (74.2%*)
Hen : cock ratio		1:2.1	1:2.9	1:2.6	1:2.7	1:3.7	1:3	1:2.8	1:6.3	1:2.9
Mortality	Hen	3	8	4	2	8	1	7	3	36
	Cock	6	7	6	4	3	3	9	3	41

*: Percentage values grand total number of hatched eggs; embryo physiological status of the unhatched eggs was not evaluated; mortality cut across both sexes.

Table 2 presents the effect of "blunted-end" egg shape on hatchability and sex ratio in Japanese quails. The incubation period was uniformly 18 days in all the egg clutches incubated throughout the study period. This agreed with the observation of Romao *et al*. (2009) that Japanese quail eggs hatch normally between 16 and 18 days of incubation. In a total of 550 eggs incubated in 8 egg clutches, 327 eggs (representing 59.5%) hatched. This value was similar to the observations of Mani *et al*. (2008) and Romao *et al*. (2009) in Japanese quail. Out of this, 72.8% (238) were hens and 27.2% (89) were cocks, corroborating Nigerian traditions and beliefs that "pointed-end" eggs produce male hatchlings in poultry species. Even when more mortality (41) was observed among the cocks, it occurred in both sexes thus, the observation may not be due to the "pointedness" or "bluntness" of the egg shape.

Table 2: Influence of "blunted-end" egg shape on hatchability and sex ratio in Japanese quails

Parameters		Egg clutches incubated								
		1	2	3	4	5	6	7	8	Grand total
No. of eggs incubated		100	100	100	50	50	50	50	50	550
Incubation period		18	18	18	18	18	18	18	18	-
No. of hatched eggs		69	53	57	29	43	23	25	28	327
Hatchability (%)		69	53	57	52	86	46	50	56	59.5
No. of hens		44	42	48	16	32	17	17	22	238 (72.8%*)
No. of cocks		25	11	9	13	11	6	8	6	89 (27.2%*)
Hen : cock ratio		1.8:1	3.8:1	5.3:1	1.2:1	2.9:1	2.8:1	2.1:1	3.7:1	2.7:1
Mortality (%)	Hen	9	5	5	4	7	3	2	4	39
	Cock	12	8	9	2	3	5	1	1	41

*: Percentage values grand total number of hatched eggs; embryo physiological status of the unhatched eggs was not evaluated; mortality cut across both sexes.

More essentially, the sex ratio was observed to skew towards more hens indicating that "blunted-end" egg shape apparently influenced sex determination in Japanese quail. This observation apparently lent more credence to the observations of Göth and Booth (2005) and Eiby *et al*. (2008) that more hens hatched in

avian species in Japanese quail but contradicted the observations of Idahor *et al*. (2015a; b; c; d) in some poultry species.

Conclusion

Since "pointed-end" egg shape apparently hatched more cocks and "blunted-end" egg shape yielded more hens, this study seemingly elucidated the claims and speculations of many Nigerian traditions and beliefs on the influence of poultry egg shape on sex determination in poultry species. However, repeated in-depth research should be conducted in this regard, before the adoption of this preliminary finding.

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