



Effect of Season on Mortality of Japanese Quail (*Coturnix Coturnix Japonica*) in Different Age Groups

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Abstract

Two years data on mortality of Japanese quail (*Coturnixcoturnix japonica*) of Central Poultry Development Organization (Eastern Region), Bhubaneswar (from October, 2012 to July, 2014) in three different seasons of summer, monsoon and winter were analyzed. The average temperature ranges between 10^o C in winter to 45^o C in summer. The average relative humidity ranges from 40% to 95%. Average annual rainfall is 154cm. The total chick (0-3 week) mortality was 3.65 % with a weekly value of 7.25 % in 1st week, 2.06 % in 2nd week and 0.93 % in 3rd week. So far as seasons were concerned, 1st, 2nd and 3rd weeks mortality were 8.99 %, 3.12 % and 1.75 % in monsoon; 7.63 %, 2.52 % and 0.87 % in winter and 6.69 %, 1.62 % and 0.84 % in summer respectively. The mortality as recorded on total chicks rearing was significantly lowest ($P < 0.01$) in summer followed by winter and monsoon. The season's pooled mortality in grower (4-5 week) and adult (above 5 week) were 0.70 % and 0.53 % respectively. The overall Japanese quail death was significantly ($P > 0.01$) higher in monsoon followed by winter and summer.

Keywords: Japanese quail, mortality, season and mean.

Introduction

Quail farming is becoming popular among the poultry farmers now-a-days. It has an edge over other poultry species farming due to its small size, less floor space requirement, short incubation period, high growth rate, early maturity, low generation gap, high rate of egg production, low feed intake, low medication and vaccination requirement. The Japanese quail belongs to the order Galliformes, family Phasianidae, genus *Coturnix*, species *coturnix* and sub-species *japonica*. Its scientific name is *Coturnixcoturnix japonica*¹⁻³. The Japanese quail is recently been farmed in large number throughout the world⁴. Farms have been established in countries like Japan, India, China, Italy, Russia and the United States⁵. It has been used mostly in research purposes in state, federal, university and private laboratories⁶. Fields of research in which Japanese quail is highly used these days include nutrition, embryology, pathology, genetics, oncology, behavior and toxicity of pesticides⁷.

In near future Japanese quails play an integral part in forever evolving poultry industry of India as they are gaining popularity in commercial sector very fast. They can be a very good and economic source of diet rich in animal protein and now being bred for meat and eggs⁸. Japanese quail is more resistant to diseases than chicken⁹. But the brooding period is very critical for them. The mortality is highest in the first week that drastically reduces in the subsequent age groups. Mortality also varies in different seasons i.e. the seasonal variation has a greater impact on the mortality of Japanese quail chicks. The climate in and around Bhubaneswar reveals that it is a tropical

climate specially a hot and humid climate. The average temperature ranges between 10^oC in winter to 45^oC in summer. The average relative humidity ranges from 40% to 95%. Average annual rainfall is 154cm. Therefore a study was conducted at the Central Poultry Development Organization (Eastern Region), CPDO (ER) Bhubaneswar to find out the seasonal variation and effect of age on mortality of Japanese quail.

Material and Methods

Data on mortality of Japanese quail (*Coturnixcoturnix japonica*) of CPDO (ER), Bhubaneswar from October, 2012 to July, 2014 was utilized under this study. The collected age specific data of chick (0-3 week), grower (4-5 week) and adult (above 5 week) was divided into 3 Indian seasons of Summer that continues from March to June, Monsoon that continues from July to October and Winter that continues from November to February. All the chicks were obtained from foundation stocks of CPDO (ER).

Deep litter system was maintained in the quail house with the minimum height of the litter material being 5 cm. The top layer of litter was covered with a gunny sheet to avoid slippery floor and absorb unwanted spilled water during drinking. The temperature maintained during first week of brooding period was 95° F that was gradually reduced to 70° F by end of 3rd week of age. The floor space assigned as 75 sq. cm. /bird from 0-3 weeks of age and 150-175 sq. cm/bird from 4-5 weeks age. Feeding and watering space was provided @ 2 and 1 linear cm respectively up to 3 weeks and it was increased 50% more from

4-5 weeks. Other standard management practices were followed during the entire testing period.

The dead birds from each and every age group were collected separately and necropsy examination was performed on the dead birds on day to day basis. The data was collected on different parameters and its statistical analysis was conducted as per procedure¹⁰.

Results and Discussion

Chick mortality Vs three Indian seasons: In Japanese quail chick stage ranged from day old to 3rd week, in comparison to fowl which is ranged from 0-8 week of age. Out of 3 weeks, first week is very crucial for quail due to its size and nature of feather development in early stage. The total no. of chicks housed, number of died and percentage of mortality calculated during brooding period is presented in table-1. Total mortality percentage in 1st week age group in 3 different seasons i.e. monsoon, winter and summer were 8.99%, 7.63% and 6.69% respectively. The values during 2nd week were 3.12%, 2.52% and 1.62% respectively. Similarly, the mean values in 3rd week were estimated as 1.75%, 0.87% and 0.84% respectively (table-1).

The seasons pooled mean values of mortality were recorded as 7.25 %, 2.06 % and 0.93 % in 1st, 2nd and 3rd week of age groups respectively. The total chick mortality was significantly (P>0.01) higher (4.75 %) in monsoon followed by 4.17 % in winter and 3.15 % in summer. The season's pooled mean value of mortality of total chick was recorded as 3.65%. It shows significantly higher (P>0.01) mortality in the 1st week and then subsequently decreases drastically as age advances. The season wise rearing of quail chicks shows significantly (P<0.01) lower death rate in summer followed by winter and monsoon. This finding collaborates with the studies done by some other researchers^{11,12}.

Grower and adult mortality Vs three Indian seasons: The total number of 4th and 5th week Japanese quails housed in all the 3 different seasons along with their respective number of mortality and its percentage for the whole period of observation is presented in table-2. Total mortality in 4th week age group in 3 different seasons i.e. monsoon, winter and summer were 0.13 %, 0.70 % and 0.60 % respectively and that during 5th and above age group is 0.95 %, 0.53 % and 0.48 % respectively. The season's pooled mean values of mortality of total chick were recorded as 1.15%, 0.63% and 0.54% in monsoon, winter and summer respectively. The grower and adult quail mortality percentage were recorded significantly lower value (p<0.01) in summer followed by winter and monsoon. This mortality trend in different seasons is in contradiction to previous findings^{11,12}. The comparison of mortality in different age groups as per the three different seasons is given in figure-1.



Figure-1
 1st week Japanese quails underbrooder

Table-1
 Mortality statement of Japanese quail chicks (0 to 3 weeks) of age

Season	Year	Chick									Total chicks		
		1 st week			2 nd week			3 rd week			No of bird housed	No of died	% of mortality
		No of bird housed	No of died	% of mortality	No of bird housed	No of died	% of mortality	No of bird housed	No of died	% of mortality			
Monsoon	2012-13	5845	429	7.34	6225	214	3.44	6177	70	1.13	18247	713	3.91
	2013-14	10794	1067	9.89	9098	264	2.90	9006	196	2.18	28898	1527	5.28
Monsoon total		16639	1496	8.99	15323	478	3.12	15183	266	1.75	47145	2240	4.75
Winter	2012-13	27991	758	2.71	20493	404	1.97	20387	216	1.06	68871	1378	2.00
	2013-14	51228	5288	10.32	40420	1128	2.79	31983	238	0.74	123631	6654	5.38
Winter total		79219	6046	7.63	60913	1532	2.52	52370	454	0.87	192502	8032	4.17
Summer	2012-13	38326	989	2.58	36611	363	0.99	36838	231	0.63	111775	1583	1.42
	2013-14	66166	6004	9.07	62801	1252	1.99	57840	561	0.97	186807	7817	4.18
Summer total		104492	6993	6.69	99412	1615	1.62	94678	792	0.84	298582	9400	3.15
Season pooled		200350	14535	7.25	175648	3625	2.06	162231	1512	0.93	538229	19672	3.65

Table-2
Mortality statement of Japanese quail growers (4th week) and adult (5th week and above)

Season	Year	Grower			Adult			Total of grower and adult		
		4 th week			5 th week and above			No of bird housed	No of died	% of mortality
		No of bird housed	No of died	% of mortality	No of bird housed	No of died	% of mortality			
Monsoon	2012-13	2480	63	2.54	2966	63	2.12	5446	126	2.31
	2013-14	8851	87	0.98	7058	32	0.45	15909	119	0.75
Monsoon total		11331	150	0.13	10024	95	0.95	21355	245	1.15
Winter	2012-13	4532	52	1.15	4037	16	0.40	8569	68	0.79
	2013-14	11921	63	0.53	8160	49	0.60	20081	112	0.56
Winter total		16453	115	0.70	12197	65	0.53	28650	180	0.63
Summer	2012-13	30797	128	0.42	34552	132	0.38	65349	260	0.40
	2013-14	41938	308	0.73	39455	220	0.56	81393	528	0.65
Summer total		72735	436	0.60	74007	352	0.48	146742	788	0.54
Season pooled		100519	701	0.70	96228	512	0.53	196747	1213	0.62

Post mortem findings: In 1st week chicks: In chicks, important gross lesions involved unabsorbed yolk sac suggesting bacterial invasion (figure-3). Another prominent feature involved pneumonic lungs with frothy fluid coming out of cut edges (figure-4). Lungs were congested in some of the cases. Trachea had frothy exudates. Liver showed patchy haemorrhages (figure-5). Haemorrhagic GI tract was a prominent feature (figure-6). Bursa of Fabricius was hemorrhagic and also spleen showed patchy hemorrhages. From the above observations, it is suggested that death may be due to either lack of sudden acclimatization of newly hatched small chicks to environment or lack of sensitiveness of chicks to feed and water.

In 2nd week chicks: There was a sudden drop in mortality. Important pathological lesions involved enteritis and hepatitis. In some cases there were signs of chilling in lungs and trachea. Hemorrhages in the spleen, liver and kidney were also prominent. Some quail chicks died due to drowning in the water pot that may be due to in-coordination between chick size and water space.



Figure-3
 Unabsorbed yolk sac



Figure-2
 1st week dead chicks



Figure-4
 Frothy fluid coming out of the lungs

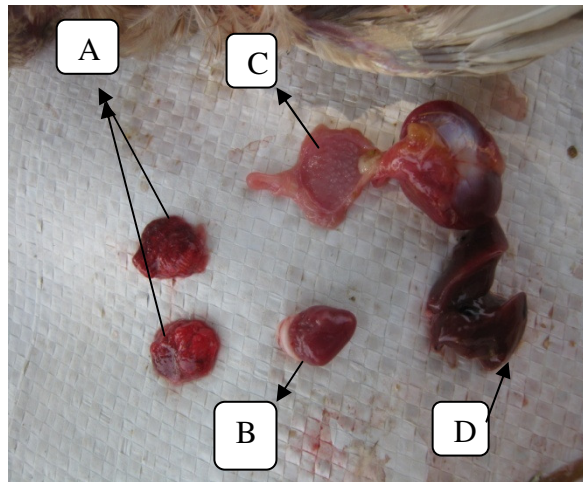


Figure-5
A-Congested lungs C-Proventriculus, D- Hemorrhagic liver

In 3rd week chicks: Japanese quail chicks had signs of ulcerative enteritis. Lungs and liver were congested. Kidney had hemorrhagic spots. Outer wall of proventriculus had hemorrhagic spots. Gizzard had litter material that may be due to sudden removal of papers/gunny sheets from top of the litter, because they may confuse with feed and litter materials due to colour blindness character of quail chicks. During last part of 2nd week and beginning of 3rd week, some chicks observed in-coordination movement, lameness and torticollis which may be due to high growth of chicks and deficiency of calcium, phosphorous and B vitamins.



Figure-6
Haemorrhagic GI tract

In 4th week and 5th week quail growers: Death rate was minimal in 4th and 5th week; however, some sporadic death reveals PM signs of enteritis and hepatitis. In some occasional cases, multi-focal small pale areas were found on liver and spleen. Lungs were congested. Hemorrhagic intestine and kidney were observed.

Conclusion

The results of this study revealed that, mortality in Japanese quails was significantly highest in the 1st week of their life irrespective of seasons which subsequently decreases as age advances. It may be due to the critical period of brooding during which the hypothalamic development and thermoregulation is not properly organized. So far as seasons are concerned, the results showed that Japanese quail is very sensitive to environment. The mortality is lowest in summer followed by winter and monsoon. It may be due to the fact that mortality increases due to erratic change in environmental temperature during monsoon which causes pilling up of the Japanese quail chicks at the corner of the chick guards during brooding stage.

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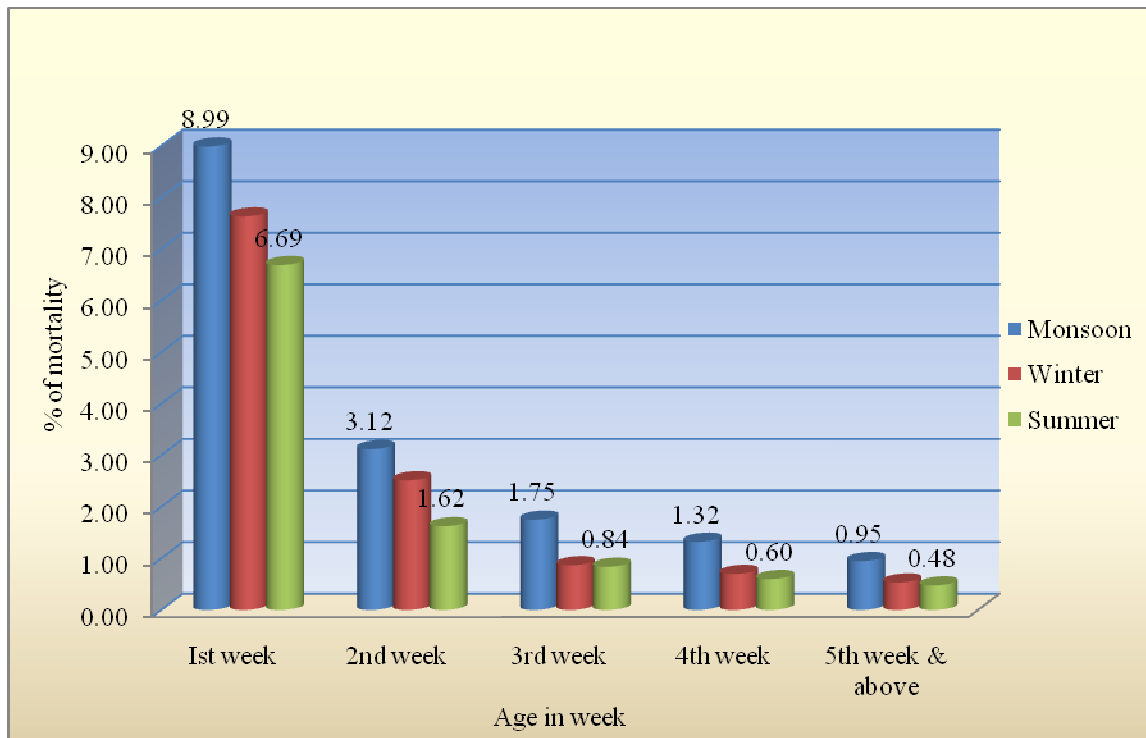


Figure-7
Mortality Status of Japanese Quail

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