

Original Research Article

Comparative Assessment of Fertility and Hatchability of Kadaknath and Aseel Fowls

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ABSTRACT

Keywords

Eggs, Fertility,
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The present study was conducted to compare the fertility and hatchability of Kadaknath and Aseel fowls. For this purpose 50 birds from each breeds comprising of 45 females and 5 males were selected and kept in two different pens at poultry unit of Teaching Livestock and Poultry Farm of the College of Veterinary Science and Animal Husbandry, N.D.U.A.T. Kumarganj Faizabad (U.P.). Fertility was found higher in Kadaknath (86.18) than Aseel (81) with significant difference among them. Both hatchability on set egg and hatchability on fertile eggs were significantly differed among two breeds being higher in Kadanath. Average chick weight was found higher in Aseel than Kadaknath. Normal chick % was found highest in Kadaknath followed by Aseel. This result indicates that Kadanath are superior to Aseel in relation to fertility, hatchability and related traits.

Introduction

Indian poultry industry has made a tremendous and remarkable progress evolving from small scale backyard venture to the status of commercial, full-fledged, self sufficient and most progressive agro based industry. Poultry accounts for more than 30% of all animal protein consumption worldwide (Permin and Pedersen, 2000). Fertility and hatchability are the main factor which affects the profitability in the hatchery enterprise (Peters *et al.*, 2008). These parameters appears to be very important as for as parent stocks are kept to produce final hybrids. Hatchability is a major complex age dependent traits. Egg production and hatchability of broiler eggs can be influenced considerably by age of

flock (Elibol *et al.*, 2002). Kadaknath (KN) is an important Indian reared poultry breed which is well known for poor egg production, slow growth rate, smaller body size as well as late sexual maturity. Aseel is noted for its Pugnacity, high stigma, and majestic gait and dogged fighting qualities.

The present experiment was designed –

1. To find the fertility, hatchability and associated traits in Kadaknath and Aseel.
2. To find out the correlation among hatchability traits in Kadaknath and Aseel.

Materials and Methods

An experiment was carried out at Poultry unit of teaching Livestock and Poultry farm of the college of Veterinary Science and Animal Husbandry, N.D.U.A.T. Kumarganj Faizabad (U.P.) to investigate the fertility and hatchability of Kadaknath and Aseel birds. The birds selected for the experiment were 42 week of age, 50 birds from each breed were selected for the experiment. Each group of 50 birds consisted of 46 female and 4 male birds. All the three groups of birds were kept on deep litter system and provided standard floor space per bird. The eggs were placed with the large end up in the tray and the eggs were clearly labelled. At 7th day of candling movement of developing embryo was seen and red spider-like radiating lines also seen in fertile eggs. Infertile eggs were clear as with fresh eggs but they had bigger air cell. At 18th day of candling fertile eggs were seen to be densely clouded and opaque with network of veins indicating development of embryo within the eggs while the unfertile eggs were translucent under the light. Number of infertile eggs and embryonic mortality were recorded. The live fertile eggs were transferred from the setting trays to different compartment of hatching tray according to breed and replication in the afternoon of the 18th day of incubation. Both fertility and hatchability were calculated as follows-

Fertility (%) =

$$\frac{\text{Total no. of fertile eggs}}{\text{Total no. of eggs set for incubation}} \times 100$$

Hatchability (%) =

$$\frac{\text{Total no. of eggs hatched}}{\text{Total no. of fertile eggs set for hatching}} \times 100$$

Hatchability (%) on Total Eggs =

$$\frac{\text{Total no. of chicks hatched}}{\text{Total no. of eggs set for incubation}} \times 100$$

The data collected in each group on fertility, hatchability, chick weight, normal chicks and abnormal chicks were analyzed using an SPSS statistical package (version 11.5), to obtain the mean and standard error (S.E.) values of various parameters for comparison among these three breeds. The significance of differences in various measurements was tested using Duncan's Multiple Range test.

Results and Discussion

Fertility

The least square means (Table 1) of fertility (%) were 87.18 ± 2.92^a , 80.00 ± 3.00^b for Kadaknath and Aseel chickens respectively. There was significant ($P < 0.05$) differences between fertility among different chicken breeds under study. Higher fertility was recorded in Kadaknath as compared to Aseel. Islam *et al* (2002) reported in their study that fertility was highest in White Leghorn, intermediate in White Rock and lowest and similar in Barred Plymouth Rock and RIR ($P < 0.01$).

Farooq *et al* (2001) observed that fertility (%) in eggs of Desi (74.74 ± 0.08) was higher than the eggs of Fayoumi (64.71 ± 0.23) and RIR chickens (53.06 ± 0.39). Haunshi *et al* (2012) reported similar fertility in Aseel (86.96%) and Kadaknath (85.15%). Mohan *et al*. (2008a) observe 84% fertility in PeelaAseel and Mohan *et al*. (2008b) recorded 81% fertility in Kadaknath which is nearly similar to present findings.

Hatchability

The Hatchability (%) from fertile eggs was higher (Table 1) for Kakaknath (75.27 ± 2.35) than Aseel (68.36 ± 3.53). Hatchability from set eggs (%) was also highest for Kadaknath followed by Aseel. The present study was in consistent with Haunshi *et al* (2011) who reported a relatively higher hatchability in Kadaknath (77.94%) than Aseel eggs (70.74%). Mohan *et al.* found slightly higher (88% and 67%) hatchability on the basis of fertile egg set and total egg set respectively than the present study. Umesh *et al.* find lower hatchability (37.93%) on total egg set and higher hatchability on fertile egg set in comparison to present study.

Farooq *et al* (2001) reported that the hatchability on the basis of total egg set (%) was highest in Fayoumi (65.96 ± 0.07) followed by Desi Scavenger (61.76 ± 0.08) and RIR (42.96 ± 0.07) while hatchability on the basis of fertile eggs was highest for Fayoumi (88.57 ± 0.08) followed by RIR (80.77 ± 0.10) and Desi Scavenger (60.00 ± 0.08).

Correlation of hatchability traits for hen

Correlation among hatchability traits of Kadaknath and Aseel are presented in table 2 and 3.

Kadaknath

Significant positive correlation (0.968) were found between fertility and hatchability on fertile eggs ($P < 0.01$), fertility and hatchability on set eggs ($P < 0.01$), fertility and egg weight ($P < 0.01$), fertility and chick weight ($P < 0.01$), fertility and egg volume ($P < 0.01$), fertility and egg shape index ($P < 0.01$) and fertility and normal chick percentage ($P < 0.01$).

There was also significant positive correlation (0.998) between hatchability on

set eggs and average egg weight ($P < 0.01$), hatchability on set eggs and chick weight ($P < 0.01$), average egg volume and hatchability on set eggs ($P < 0.01$), hatchability on set eggs and egg shape index ($P < 0.01$) and hatchability on set eggs and normal chicks percentage ($P < 0.01$).

Egg weight and chick weight was strongly positively correlated (0.998) between each other ($P < 0.01$). Significant positive correlation (1.000) was also found between egg weight and egg volume ($P < 0.01$), egg shape index and egg weight ($P < 0.01$), normal chick percentage and egg weight ($P < 0.01$).

There was significant positive correlation (0.998) between chick weight and average egg volume ($P < 0.01$), average chick weight and egg shape index ($P < 0.01$), normal chick percentage and average chick weight ($P < 0.01$).

Some negative significant correlation were observed between abnormal chick percentage and all other hatchability traits under study such as fertility percentage, hatchability on fertile eggs, hatchability on set eggs, average egg weight, average chick weight, average egg volume, average egg shape index and normal chick percentage.

Aseel

Significant positive correlation (0.953) were found between fertility and hatchability on fertile eggs ($P < 0.01$), fertility and hatchability on set eggs ($P < 0.01$), fertility and egg weight ($P < 0.01$), fertility and chick weight ($P < 0.01$), fertility and egg volume ($P < 0.01$), fertility and egg shape index ($P < 0.01$) and fertility and normal chick percentage ($P < 0.01$).

There was also significant positive

correlation (0.989) between hatchability on fertile eggs and hatchability on set eggs (P<0.01), egg weight and hatchability on fertile eggs (P<0.01), hatchability on fertile eggs and chick weight (P<0.01), hatchability on fertile eggs and egg volume (P<0.01), hatchability on fertile eggs and egg shape index (P<0.01) and normal chick percentage and hatchability on fertile eggs (P<0.01).

Significant positive correlation (0.996) also found between hatchability on set eggs and egg weight (P<0.01), hatchability on set eggs and chick weight (P<0.01), average egg volume and hatchability on set eggs (P<0.01), hatchability on set eggs and egg shape index (P<0.01) and hatchability on set eggs and normal chicks percentage (P<0.01).

Table.1 The effect of breed on the different hatchability traits

Variables	Kadaknath	Aseel
Fertility (%)	87.18±2.92 ^a	80.00±3.00 ^b
Hatchability from fertile eggs (%)	75.27±2.35 ^a	68.36±3.53 ^b
Hatchability from set eggs (%)	64.81±0.66 ^a	55.70±2.31 ^b
Normal chicks (%)	100.00±0.00 ^a	98.15±1.65 ^{ab}
Abnormal chicks (%)	0.00±0.00 ^b	1.65±1.65 ^{ab}
Average chick weight (g) n= 50	28.18±0.22 ^b	36.65±0.75 ^a
Average egg weight (g)	42.58±0.34 ^c	49.72±0.65 ^b
Average egg volume(cm ³)	39.61±0.37 ^c	47.23±0.60 ^b
Average egg shape index	75.89±0.50 ^a	75.56±b0.39 ^a

*Means having dissimilar superscripts within row differ significantly

Table.2 The Correlation coefficient of different hatchability traits of Kadaknath hens

	1	2	3	4	5	6	7	8	9
1	1.000								
2	0.968**	1.000							
3	0.992**	0.991**	1.000						
4	0.991**	0.991**	0.998**	1.000					
5	0.990**	0.993**	0.999**	0.998**	1.000				
6	0.992**	0.988**	0.997**	1.000**	0.998**	1.000			
7	0.992**	0.990**	0.998**	1.000**	0.999**	1.000**	1.000		
8	-0.991**	-0.992**	-0.999**	-1.000**	-0.999**	-0.999**	-1.000**	1.000	
9	0.991**	0.992**	0.999**	1.000**	0.999**	0.999**	1.000**	-1.000**	1.000

Where, 1=fertility (%), 2=Hatchability on fertile eggs(%), 3=Hatchability on set eggs (%), 4=Average egg weight (g), 5=Av. Chick weight (g), 6=av. Egg volume (cm3),7=av. Egg shape index , 8=abnormal chicks (%), 9=normal chicks (%)

Table.3 The Correlation Coefficient of different hatchability traits of Aseel hens

	1	2	3	4	5	6	7	8	9
1	1.000								
2	0.953**	1.000							
3	0.980**	0.989**	1.000						
4	0.979**	0.992**	0.996**	1.000					
5	0.975**	0.978**	0.972**	0.986**	1.000				
6	0.980**	0.991**	0.993**	1.000**	0.990**	1.000			
7	0.990**	0.979**	0.986**	0.992**	0.996**	0.994**	1.000		
8	-0.618	-0.706	-0.627**	-0.693	-0.766	-0.710	-0.705	1.000	
9	0.979**	0.979**	0.977**	0.988**	1.000**	0.992**	0.997**	-0.754	1.000

Where, 1=fertility(%), 2=Hatchability on fertile eggs(%), 3=Hatchability on set eggs (%), 4=Average egg weight (g), 5=Av. Chick weight (g), 6=av. Egg volume (cm³),7=av. Egg shape index , 8=abnormal chicks (%), 9=normal chicks (%)

Egg weight and chick weight was strongly positively correlated (0.986) between each other (P<0.01). Significant positive correlation was also found between egg weight and egg volume (P<0.01), egg shape index and egg weight (P<0.01) , normal chick percentage and egg weight (P<0.01). There was significant positive correlation (0.990) between chick weight and average egg volume (P<0.01), average chick weight and egg shape index (P<0.01), normal chick percentage and average chick weight (P<0.01).

The positive correlations of egg weight with chick weight regardless of breeds found are well understood. Such egg weight related chick weight noted agrees with Salahuddin *et al* (1995). they obtained heavier chicks from larger eggs for Desi chicken. A positive correlation of egg size with fertility and hatchability was found in all breeds. This result agrees with Salahuddin *et al* (1995) who recorded higher fertility and hatchability of heavier eggs in Desi chickens. Similar finding also reported by Islam *et al.* (2002) who observed significant positive correlation between fertility and hatchability on fertile eggs, fertility and hatchability on set eggs, hatchability on

fertile eggs and hatchability on set eggs, egg weight and chick weight in RIR, White Leghorn, Barred Plymouth Rock and White Rock hens. Farooq *et al* (2001) found positive correlation of egg weight with hatching chick weight in RIR, Desi Scavenger and Fayoumi chickens in Pakistan. Abiola *et al* (2008) observed close correlation between egg size and chick hatching weight. Small chick hatch from small egg and large chicks hatched from large eggs similarly Abiola *et al* (1999) also found close correlation between egg weight and hatching weight in domestic birds similar to the present observation. Malago and Baitiwake (2009) observe significant (p < 0.001) positive relationships between egg volume and egg weight, chick hatch weight and egg weight, and chick hatch weight and egg volume for all chickens.

The present study may be concluded that the fertility, hatchability and other traits of Kadaknath was recorded higher than Aseel.

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