

Growth and hatch performance of geese in hilly terrain of Nilgiris

R ANILKUMAR¹, M IYUE² and R VENKATARAMANAN³

Tamil Nadu Veterinary and Animal Sciences University, Sheep Breeding Research Station,
Sandynallah, Tamil Nadu 643 237 India

Received: 21 September 2013; Accepted: 10 June 2015

Key words: ADG, Clutch size, Geese, Growth rate, Hatchability, Survivability

Waterfowls in general have considerably lower reproduction potential than chickens. The number of eggs laid by each goose during one laying cycle is relatively low (Bednarczyk and Rosinski 1999). However, geese (Yang *et al.* 2009) and Pekin ducks (Bochno *et al.* 2005), grow faster than broiler chickens (Murawska, 2013) at early stage of life. Various factors like age, season (Wang *et al.* 2009) and environment affect the reproductive performance of geese. Similarly, the growth rate was also affected by season of birth of gosling, age of the dam (Tilki and Inal 2004), egg weight, hatch weight and sex (Spiller *et al.* 2003) of the gosling. Literature on performance of geese under Indian conditions is very limited. The present study was undertaken to study the growth and hatch performance of the geese maintained at Sheep Breeding Research Station, Sandynallah, The Nilgiris District, Tamil Nadu.

Data related to the performance traits recorded in this station from 1997 to 2009 were taken for analysis. The data relating to laying (start and end of laying), brooding, number of eggs laid, number hatched and growth particulars of goslings hatched were taken for analysis. Clutch size, hatchability percentage, survivability and average daily gain and growth pattern were worked out. The geese are maintained under semi intensive system of rearing. The goslings are allowed to be with their dam till they are 2 months of age. Concentrate feed was provided adlibitum to the gosling along with cut grasses and they are slowly introduced to pasture and water bodies. The goslings are categorized as adult once they reach 6 months of age.

The effect of year and season of birth of gosling and age of dam on reproductive traits were analyzed. The climate condition prevailing in this area are clearly marked as summer (SUM) – Mar-May, south west monsoon (SWM) – Jun-Aug, north east monsoon (NEM) - Sep-Nov and winter (Win) - Dec-Feb. The effect of year, season of birth

and hatch weight of gosling and age of dam on body weight and growth (ADG) were analyzed (Harvey 1990). The effect of age of dam and hatch weight on survivability was also analyzed.

Average clutch size in the present study was 7.18 ± 0.14 (Table 1). Only the year had significant effect on clutch size ($P < 0.01$). The clutch size in the present study was less than those observed by Wang *et al.* (2005) and Wang *et al.* (2009). However, the clutch size was similar to those observed by Spiller *et al.* (2003). Under natural conditions, the White Roman Geese had a regular breeding season extending from Oct-May (Wang *et al.*, 2009). However,

Table 1. Reproductive and productive characteristics of geese

Character	Values
Clutch size	7.18 ± 0.14 (181)
Number hatched	4.43 ± 0.15 (168)
Hatchability percentage	62.35 ± 1.92 (168)
Days in laying	12.65 ± 0.28 (181)
Days in brooding	31.30 ± 0.22 (168)
Hatch weight	89.75 ± 0.70 g (711)
4 th week	613.82 ± 11.30 g (595)
2 nd month	1.45 ± 0.02 kg (513)
4 th month	2.68 ± 0.04 kg (282)
6 th month	3.00 ± 0.04 kg (200)

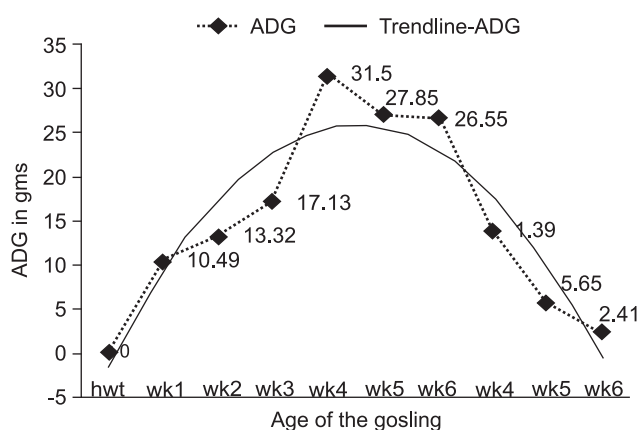


Fig. 1. Growth rate of gosling.

Present address: ¹Professor (ootyanil@yahoo.com), Department of Veterinary Gynaecology and Obstetrics, Veterinary College and Research Institute, Namakkal. ²Professor and Head (iusbrs@yahoo.com). ³Assistant Professor (venkyvet@gmail.com), Post Graduate Research Institute in Animal Sciences, Kattupakkam, Kancheepuram.

Table 2. Effect of year, season of birth and age of dam on reproductive parameters of geese

Characters	Clutch size	Days in lay	Clutch weight	Hatchability
Over all	7.19±0.13 (181)	12.71±0.26 (181)	393.24±15.93 (161)	62.35(168)
Year	**	**	NS	NS
Sea	NS	*	NS	NS
SUM	7.48±0.26 (49)	13.11±0.50 (49)	397.54±28.67 (47)	57.71(47)
SWM	6.72±0.28 (46)	11.79±0.54 (46)	401.53±33.56 (41)	70.13(43)
NEM	7.65±0.25 (53)	13.90±0.48 (53)	419.80±30.87 (43)	62.66(48)
WIN	6.92±0.31 (33)	12.05±0.60 (33)	354.09±35.67 (30)	57.95(30)
Age of the dam	NS	NS	significant effect P<0.05)	NS

Table 3. Effect of year, season of birth, sex and hatch weight of gosling and age of dam on body weight, ADG and survivability of gosling from hatching to 6 months

Character	Weight					ADG				Survivability
	Hatch (g)	Fourth week (g)	Second month (kg)	Fourth month (kg)	Sixth month (kg)	Hatching to 4 th week	4 th week 2 nd month	2–4 month	4–6 month	
Over all	90.49 ±0.46 (711)	613.82 ±11.30 (595)	1.45 ±0.02 (513)	2.68 ±0.04 (282)	3.00 ±0.04 (200)	19.01 ±0.37 (595)	22.45 ±0.35 (513)	19.22 ±0.66 (282)	5.60 ±0.63 (200)	65.38 ±1.59 (711)
Year	**	**	**	**	**	**	**	**	**	**
Sea	**	**	**	*	NS	**	**	**	NS	**
SUM	91.26 ±0.85 (199)	634.92 ±18.61 (178)	1.32 ±0.04 (160)	2.71 ±0.08 (64)	2.94 ±0.07 (52)	19.43 ±0.67 (178)	20.51 ±0.63 (160)	24.36 ±1.22 (64)	6.15 ±1.09 (52)	72.30 ±2.93 (199)
SWM	91.45 ±0.93 (196)	674.62 ±21.70 (164)	1.55 ±0.04 (133)	2.51 ±0.07 (80)	2.99 ±0.07 (40)	20.85 ±0.78 (164)	24.24 ±0.75 (133)	15.00 ±1.14 (80)	4.49 ±1.21 (40)	63.09 ±3.24 (196)
NEM	90.19 ±0.87 (192)	653.10 ±19.95 (154)	1.52 ±0.04 (128)	2.72 ±0.08 (72)	3.16 ±0.07 (60)	20.08 ±0.71 (154)	23.87 ±0.72 (128)	19.92 ±1.22 (72)	6.12 ±1.10 (60)	56.71 ±3.00 (192)
WIN	89.05 ±1.08 (124)	529.83 ±25.16 (99)	1.36 ±0.05 (92)	2.47 ±0.08 (66)	2.99 ±0.08 (48)	15.68 ±0.90 (99)	21.20 ±0.85 (92)	17.59 ±1.26 (66)	5.65 ±1.25 (48)	69.43 ±3.72 (124)
SEX	NS	*	NS	**	**	*	NS	**	NS	NS
Male	91.55 ±0.87 (186)	673.94 ±20.51 (186)	1.55 ±0.04 (185)	2.90 ±0.05 (126)	3.23 ±0.05 (99)	20.80 ±0.50 (186)	24.32 ±0.60 (185)	22.25 ±0.79 (126)	5.91 ±0.80 (99)	
Female	90.41 ±0.84 (204)	617.02 ±19.59 (204)	1.46 ±0.03 (201)	2.51 ±0.05 (133)	2.81 ±0.05 (101)	18.81 ±0.70 (204)	22.81 ±0.57 (201)	18.73 ±0.77 (133)	5.30 ±0.79 (101)	
Age of the dam	**	*	*	*	NS	*	*	**	*	NS
Hatch weight		**	NS	NS	NS	NS	NS	NS	NS	**

Significant level: * P<0.05 and ** P<0.01.

the geese reared at this station had no significant variation in eggs laid among the seasons. The laying of eggs was on alternate days and on an average the birds are in lay for 12.65±0.28 days. The average days in lay were significantly (P<0.05) higher during NEM and SUM, which was extended to clutch size with a non significant increase in clutch size during NEM and SUM (Table 2). Average brooding period was 31.30±0.22. The average age at first brooding was 725.43±80.33 days. Average age at first egg was much longer than those observed by Wang *et al.* (2005). Average clutch weight was 393.24±15.93 g and was

significantly affected by the age of the dam.

Hatchability percentage of 62.35±1.92% observed in this study was higher than those observed by Spiller *et al.* (2003) and lower than those observed by Bednarczyk and Rosinski (1999). Among all poultry species, geese is characterized by the highest initial growth rate (Yang *et al.* 2009). The growth pattern in gosling was in the shape of a sigmoid curve. The goose in the present study had highest growth at 3–4 weeks of age and gradually it was decelerating and reaching the lowest at 6 months (Fig.1). Several authors observed similar trends in the growth of goslings (Spiller

et al. 2003, Murawska and Bochno 2008). In the present study, the hatch weight was having a significant effect on body weight till fourth week only and thereafter the effect was non-significant.

Age of dam had a significant effect on body weight of gosling till 2 months of age (Tables 3). However, ADG was significantly affected by the age of the dam till 6 months of age. Tilki and Inal (2004) found that the weight of the egg increased with the age of the geese and it is extended to hatch weight also. Age of the dam had significant effect on body weight till 2 months of age. Similar to the present study, Spiller *et al.* (2003) found that the hatch weight of the gosling from young dam was lower than from older dams. The male and female goslings were of similar weight at hatching. The males were generally heavier than females at all stages of growth phase. The sexual dimorphism became expressive at 4 weeks and the difference was significant for the weight at fourth week.

The hatch weight had significant effect on survivability of gosling with heavier gosling at hatch survived better than the lighter gosling. The average age of dam of the gosling that survived ($2,034.90 \pm 50.79$) was higher than those died ($1,627.97 \pm 41.52$). The hatch weights of gosling were lower in gosling from younger dams than older dams. Survivability was the least during NEM, which correlated with highest rain fall and cooler conditions recorded at this station during this period.

In conclusion, the hatching performance and growth rate of geese in the hilly terrains of Nilgiris are comparable to those found in most of the other countries. They survive better in this conditions and there is lot of scope for improvement in all the traits studied with better management practices.

SUMMARY

The present work was undertaken to study the growth and hatch performance of geese maintained at Sheep Breeding Research Station, Sandynallah. The average clutch size was 7.18 ± 0.14 . The mean hatchability percentage was 62.35 ± 1.92 . The mean body weight at hatching was

90.49 ± 0.46 g. The year, seasons and age of dam had significant effect on hatch weight. The highest body weight gain was recorded from fourth week to second month of age. The ADG was significantly affected by year, season, age of the dam and sex in most of the growth phases. Survivability was higher in gosling born during summer and was very poor in north east monsoon period. Hatch weight had significant effect on survivability.

REFERENCES

- Bednarczyk M and Rosinski A. 1999. Comparison of Egg Hatchability and In Vitro Survival of Goose Embryos of Various Origins. *Poultry Science* **78**: 579–85.
- Bochno R, Brzozowski W and Murawska D. 2005. Age-related changes in the distribution of lean, fat with skin and bones in duck carcasses. *British Poultry Science* **46**: 199–203.
- Harvey W R. 1990. *Mixed Model Least-squares and Maximum Likelihood Computer Programme. PC-2 version*. Ohio State University, Columbus.
- Murawska D. 2013. The effect of age on the growth rate of tissues and organs and the percentage content of edible and inedible components in Koluda White geese. *Poultry Science* **92**: 1400–07.
- Murawska D and Bochno R. 2008. Age related changes in the percentage content of carcass parts in geese. *Journal of Central European Agriculture* **9**: 211–16.
- Spiller S V, Varga S, Kovács M K and Kozák J. 2003. Effect of parents' age and hatching egg weight on liver production of geese. *Arch. Geflügelk* **67** (5): 237–39.
- Tilki M and Inal S. 2004. Yield Traits of Geese of Different Origins Reared in Turkey II. Growth Traits. *Turkish Journal of Veterinary and Animal Sciences* **28**: 157–63.
- Wang C M, Kao J Y, Lee S R and Chen L R. 2005. Effects of artificial supplemental light on the reproductive season of geese kept in open houses. *British Poultry Science* **46** (6): 728–32.
- Wang C W, Chen L R, Lee S R, Yu-Shine Jea and Jung-Yie Kao 2009. Supplementary artificial light to increase egg production of geese under natural lighting conditions. *Animal Reproduction Science* **113**: 317–21.
- Yang H M, Wang Z Y, Zhu X H, Lu J and Liang Z C. 2009. Effects of starter feeding time on growth of Yangzhou geese. *Journal of Animal and Plant Sciences* **23**: 104–08.