ISSN 1330-7142
UDK = 636.598

INVESTIGATIONS ON THE NATURAL EGG LAYING HABITS OF DOMESTIC GEESE

Mónika Pandur [(1)], F. Bogenfürst [(2)]

Original scientific paper

ABSTRACT

The present study was based on the examination of the natural egg laying habits of domestic geese. The authors studied Grey Landes geese during the summer laying period. On the day of arrival of the birds a TyniTalk II artificial egg was placed in each nest. These eggs contain a microchip which detects and records data on the temperature of the surroundings. The results obtained demonstrate that after laying a certain number of eggs females laying under natural conditions sit on the nest not only when laying new eggs, but also to warm the eggs in it. The time devoted to warming increases with the laying period.

Keywords: goose female, natural lay, periodic warming, nest, artificial egg

INTRODUCTION

Problems arising from the storage of eggs date back as far as artificial incubation itself. As early as 1735 Reaumur (cit. Mayes and Takeballi, 1984) faced this problem and attempted to solve it by dipping eggs in melted mutton fat, thus succeeding in prolonging the storage life of incubated eggs.
In the course of the 20th century hatchery practice has improved through a number of results which have been achieved, but it has still not been possible to devise a standard treatment method to prevent deterioration in hatchability due to long-term storage (Valdimirova, 1969; Mayes and Takeballi, 1984; Bogenfürst, 1986). The authors of publications relating to this topic agree on the necessity to apply some type of treatment during storage to prevent the occurence of irreversible changes in the egg. This paper will devote attention to periodic pre-warming treatments linked to the present work of the authors.
The necessity for the periodic warming of eggs can be verified on examination of the behaviour of female birds under natural conditions. In such conditions the female sits on the nest and lays a new egg every 1 to 5 days (depending on species), while at the same time warming the eggs laid previously. Thus, the female ensures that the development of the embryo is initiated before she begins brooding (Tretjakov and Krok, 1968).
Embryonic development begins almost immediately after the female begins to brood on the nest, as the thread cell is positioned on top of the yolk (Bogenfürst, 1994). As a result of the position of the eggs in the nest the embryo of each is very close to the body of the female (max. 1-1.5 cm) which ensures very rapid heat exchange between the female and the embryo.
Up to the present no attempts have been made to approach the topic of the periodic warming of geese eggs during storage from the aspect of natural laying conditions.

MATHERIAL AND METHODS

Grey landes geese were studied during the summer laying period in June and July 1999. Five geese, which originated from Haker Plusz Ltd.(Hungary), were housed as follows : 1 female + 1 male (group 1) and 2 females + 1 male (group 2). The birds were taken from the laying farm at 20% general laying intensity. The degree of opening of the laying bones of the females gave an indication of the time already spent laying. This degree of opening was narrowest in the female allocated to group 1; the laying bones in the other two females were already wide opened.
The birds were fed the same layer feed as on the laying farm, available ad libitum. Drinking water was also freely available. The birds were allotted to pens of 15 or 20 m^2 ground area, in which a covered area was provided to conceal the nest or nests.

(1) Monika Pandur, Ph.D student, (2) Ferenc Bogenfürst, Full Professor - University of Kaposvár, Faculty of Animal Sciences,Guba S. u. 40, 7400 Kaposvár, Hungary

On the day of arrival of the birds a TyniTalk II artificial egg (hereafter abbreviated to AE) was placed in each nest. These eggs contain a mycrochip which detects and records data on the temperature of the surroundings. An AE has the capacity to save 1800 data, the frequency at which the data are recorded being set by the user. The programme on which an AE operates runs on Windows 95.
A data recording frequency of 1 min. 30 sec. was set, which enabled data to be recorded for a total of 45 hours.

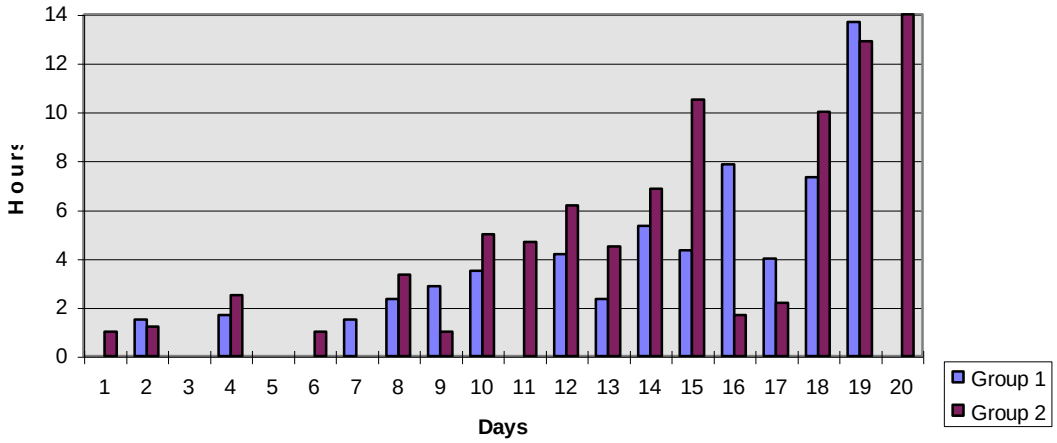
RESULTS AND DISCUSSION

The results obtained demonstrate that after laying a certain number of eggs females laying under natural conditions sit on the nest not only when laying new eggs, but also to warm the eggs in it. The time devoted to warming increases with the laying period, an aspect not yet incorporated into the practice of periodic warming prior to artificial hatching.
Examination of the results obtained for group 1 reveals that even during the laying of the first egg the female spent more than an hour on the nest. (Table and Figure). After laying the fifth egg the female sat on the nest each day for a period of varying length to warm the previously laid eggs. On the 19th day of the experiment the female spent more than half of the day on the nest, a condition bordering on brooding. The following day she actually began to brood.

Table. Lay performance of groups 1 and 2

Day	Egg laying	Warming length	Peak temperature	Egg laying	Warming length	Peak temperature
	group 1			group 2		
1	-	-	-	1n	1h30'	30.2°C
2	1	1h30'	31.3°C	1k	1h40'	28.9°C
3	-	-	-	-	-	-
4	1	1h 40'	29.9°C	1n	2h30'	31.8oC
5	-	-	-	-	-	-
6	-	-	-	1	1h	32.4°C
7	1	1h30'	33.3°C	-	-	-
8	-	2h 20'	32.6°C	1n	3h 20'	29.2°C
9	1	2h 50'	31.8°C	-	-	-
10	1	3h30'	37.3°C	2	5h	33.7°C
11	-	-	-	-	4h40'	32.6°C
12	1	4h 10'	33.7°C	2	6h 10'	33.6°C
13	-	2h 20'	31.4°C	-	4h 30'	33.1°C
14	1	5h 20'	34.3°C	1	6h 50'	34.8°C
15	-	4h 20'	37.3°C	1	10h 30'	34.9°C
16	1	7h 50'	27.2°C	1	1h 40'	32.2°C
17	-	4h	30.0°C	-	2h 10'	29.6°C
18	1	7h 20'	32.1°C	1k	10h	35.3°C
19	-	13h 40'	32.8°C	-	12h 55'	35.3°C
20		BROODING		1k	14h	28.1°C
21				-	BROODING	

Time spent on the nest, group 1 and 2



Brooding began after nine eggs had been layed. According to data in the literature goose females lay about 11 to 14 eggs before beginning the process of hatching them (Gergely 1957; Báldi, 1961). In this study fewer eggs were laid due to the fact that the females had already laid on the farm from which they were taken. It is thought that the female allocated to group 1 had laid 1 or 2 eggs before being transferred to the experimantal farm.
The temperature data shown in Table vary quite considerably. The reason for this is that the females tented to turn the eggs with their beaks before sitting on the nest. This changed the position of the AE in the nest; it was no longer as close to her body as the uppermost side of the eggs, so it recorded data only from the air warmed by the female. It can be supposed that the highest temperature recorded (37.3^{o}C) was measured very close to the body of the female.
The laying bones of the females allocated to group 2 were already wide open on arrival, which reveals an advantage in laying over the female of group 1. The duration of the laying of the first eggs shows same pattern : the females of group 2 each spent one hour on the nest until they had each laid 2 eggs, after which the laying time increased. This indicates that they had both previously laid 3 or 4 eggs on the laying farm. (Table and Figure)
After the fifth day of the experiment it became clear that domestic goose females do not remain in the immediate vicinity of their nests. At first the two females of group 2 laid their eggs in separate nests, but on the fifth day the females jointly gathered together the straw from the two nests to create a shared one. Subsequently both females laid their eggs in this nest. After spending much time watching the females it was possible, in half of all instances, to see which female was sitting on the nest. Two different letters in the data of Table indicate the females identified.

CONCLUSION

This experiment was the first stage in a long-term series of experiments. In this first stage it was possible to verify that goose females sit on their nest not only when they are laying eggs, but also to warm the eggs and keep the embryos alive with more frequent warming than had previously been supposed.
The authors intend to repeat this study in traditional goose egg laying in order to gather more data for the purpose of comparison.

REFERENCES

1. Báldy, B. (1961): A baromfi tenyésztése. Mezőgazdasági Kiadó, Budapest.
2. Bogenfürst, F. (1986): A keltethetőség javításával összefüggő tényezők hatásának vizsgálata, különös tekintettel a lúdfajra. Kandidátusi értekezés, Kaposvár.
3. Bogenfürst, F. (1994): Keltetés. Gazda Kistermelői Lap- és Könyvkiadó, Budapest.
4. Gergely, B. (1957) : A baromfikeltetés kézikönyve. Mezőgazdasági Kiadó, Budapest.
5. Mayes, F. J., Takeballi, M. A. (1984): Storage of the eggs of the fowl before incubation, World's Poultry Science Journal 40(2):131-140.
6. Tretjakov, N. P., Krok, G. Sz. (1968): Inkubacija sz osznovami embriologii. Kolosz, Moszkva.
7. Vladimirova, J.N. (1969): O predinkubacionnom podogreve kurinüh jaic. Pticevodsztvo, 33:77-81.