

# Impact of Camera Installation on Nesting Sharp-tailed Grouse (*Tympanuchus phasianellus*)

## Behavior in Western North Dakota

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### Introduction

Use of surveillance cameras to monitor avian nests has increased in popularity due to advancements in technology and increased availability. Cameras allow researchers to correctly identify nest predators, nest fates, nest defense events, and behaviors associated with incubation and brooding; however, little is understood about the impact of cameras on the target species. Several studies evaluate camera impacts by reporting abandonment and daily nest survival rates for nests with and without cameras. Few assess changes in daily behavioral patterns associated with nesting or interactions with the cameras.

### Objectives

The objective of this study is to characterize the following behaviors of female sharp-tailed grouse during the first 24 hours after camera installation:

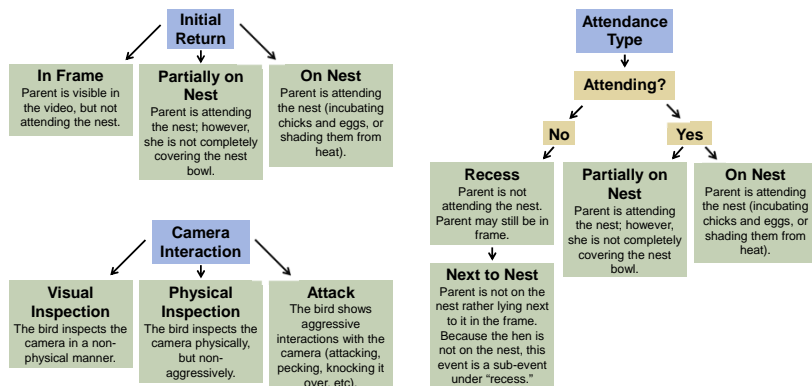
- Time to return to camera's field of view and to incubation (i.e., sitting completely on the nest)
- Time spent sitting next to and partially on nest (before initiating incubation after camera installation)
- Number and duration of recess events
- Number and duration of interactions with camera

### Field Methods

Our two field sites were located in Mountrail Co. North Dakota



35 nests were reviewed for the first 24 hours after installation. Behavior classification followed the scheme below:



### Data Analysis Methods

We calculated summary statistics and graphically represent results using Excel and program R.

### Results

#### Initial Return

- In total 6 hens abandoned their nests (Table 1).
- Hens took between an hour and an hour and a half to return to incubation (completely on nest) after camera installation (Table 2 and Figure 1).

Table 1: Number and time of abandonment after camera installation.

Time of Abandonment	Number of Abandonments
1 <sup>st</sup> 24 hours	2
24-48 hours	1
48-72 hours	0
>72 hours	3

Table 2: Time from installation to return to frame, partial incubation, and complete incubation. N = number of events.

Behavior	Median (hrs.)	Q <sub>1</sub> (hrs.)	Q <sub>3</sub> (hrs.)	Min. (hrs.)	Max. (hrs.)	N
In Frame	1.10	0.60	1.50	0.21	8.61	35
Partially on Nest	1.14	0.91	1.74	0.52	3.74	11
Completely on Nest	1.33	0.90	1.66	0.22	8.62	33

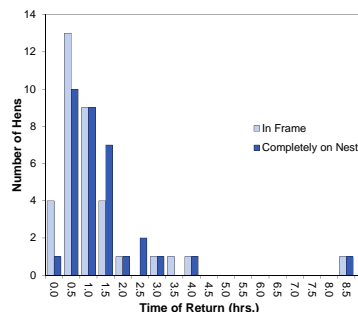


Figure 1: Time from installation to return to frame, and complete incubation. Measurements in hours.

#### Attendance

- Hens typically took two recesses with a duration of approximately 20 minutes (Table 3 and Figure 2).
- Some hens were observed sitting next to the nest or partially on the nest (1 ½ to 4 ¼ minutes, respectively) before returning to complete incubation (Table 2).

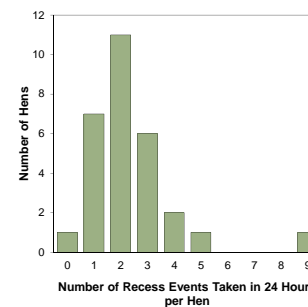


Figure 2: Number of recesses taken during the first 24 hours per hen. N = 29 hens.

Table 3: Duration and number of recesses taken per hen during the first 24 hours after installation. Time measurements are reported in minutes.

Behavior	Median (min.)	Q <sub>1</sub> (min.)	Q <sub>3</sub> (min.)	Min. (min.)	Max. (min.)	N
Duration of Recesses	19.81	13.89	27.43	0.30	79.60	66 recesses
Next to Nest	1.64	0.79	5.10	0.23	35.47	14 events
Partially on Nest	4.33	0.62	9.81	0.03	112.20	22 events

#### Camera Interactions

During the first 24 hours after camera installation:

- Five hens visually inspected the camera once, and one hen twice.
- One hen physically inspected the camera once, and one hen four times.
- One hen attacked the camera three times, and one hen four times.

Table 4: Number and duration of camera interaction events. Events were classified as separate if there was at least 30 seconds separating the event. N = number of events.

Behavior	Median (min.)	Q <sub>1</sub> (min.)	Q <sub>3</sub> (min.)	Min. (min.)	Max. (min.)	N
Visual Inspection	0.05	0.04	1.09	0.02	1.80	7
Physical Inspection	0.02	0.02	0.02	0.02	0.1	5
Attack	0.27	0.20	1.10	0.00	4.23	7

### Discussion and Management Implications

- Return time for hens after camera installation was equivalent to the duration of approximately three recess events.
- Recess events during the first 24 hours after installation were similar in duration and the number of events as recesses post-24 hours after installation (Johnson et al, unpub. data, 2012). This suggests that camera installation may not have a large impact on recess patterns.
- There were several hens that had interactions with the camera ranging from no physical interaction to aggressive. To reduce the impact of cameras, researchers may consider the following recommendations when designing methods for future camera studies:
  - Prevent removal of hen from nest (bumping) during installation
  - Increase the distance of the camera from the nest depending on the amount of vegetation that may obstruct the camera view
  - Prevent the placement of cameras directly in front of entrances or exits

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