

Preliminary Study of the Black-Crowned Night Heron (*Nycticorax Nycticorax*) on Behavior Time Allocation in Spring

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Abstract

In order to explore the influence of various environmental factors on the behavior of time distribution of Black-crowned Night Heron in spring, From March to April in 2016 year, we studied the acts of the Black-crowned Night Heron in the Xuanwu Lake, and adapted to the instantaneous scanning method to do the action sampling. The results showed that, Black-crowned Night Heron standing and the rest mainly in the main, and the two account for more than 60% in the whole *action*. But the actions, such as looking for food, flight and walk less than 10% all the time. The actions of cleaning up the feather are higher in proportion, about most between in 10%~30%. After calculating the actions on the earth and in the water area, indicate that the Duckling in the two habitats have different patterns of allocation of time. On the land, Black-crowned Night Heron standing is the main acts (about 41.56%), followed by the rest (about 33.55%), the actions of cleaning up in the third place, accounting for 15.86 %; the other actions such as feeding, walking and fighting was 2.64%, 6.38% and 3.46% respectively in the day.

Keywords— Xuanwu Lake; Black-crowned Night Heron; *Nycticorax nycticorax*; Behavior; Time allocation

I. INTRODUCTION

The Black-crowned Night Heron (*Nycticorax nycticorax*) belongs to the *Nycticorax* genus of, Ardeidae family of Ciconiiformes. The

Black-crowned Night Heron is a large wading bird with a large body, which changes with the seasons, and it is an important cage for ornamental birds, which are scattered throughout the country. Since 1990, the study of avian ecology in China has changed greatly compared with previous studies in the 1980s. Breeding research is still the main content in the research of bird ecology in our country, such as Zhang and Wang [1] studied the Black-crowned Night Heron of Taihu Lake breeding biology, their behaviour, habitats and communities and migration of significant were visibly increasing, such as Wang studied the Black-crowned Night Heron wintering population ecology and the molecular ecology research [2], Dong studied the indicates of the Taihu Lake wetland ecosystems chlorine pollution biological such as Black-crowned Night Heron [3]. This thesis is to study behavior of time distribution of Black-crowned Night Heron day, and it provides valuable scientific data for waterfowl behavior ecology research provides, it is in order to study its behavior genetics and the evolution of birds.

The research area is located in the Xuanwu Lake in Nanjing (118.79431 E, 32.07479 N). The lake bank is in a diamond shape, with a circumference of about 10km, covering an area of 437 hectares and about 368 hectares of water. There are five islands in lake, the lake is divided into four large parts, Nanjing is a humid subtropical humid climate, the average annual temperature of 15.3 degrees, the annual precipitation of 1106.5 mm, the mid- June and in early July is a plum rain season. There used to be known as "fire" in Nanjing, Sometimes the highest temperature up to 40 °C from July and August, it is generally at about 35 °C.

II. RESEARCH METHODS

A. Sampling Method

In the study, the instantaneous sampling method was used to sample the Black-crowned Night Heron behavior, and the instantaneous sampling method was also called point sampling method and fixed time sampling method. This method is to divide the observation time into many short sample intervals, and at each sample point, the observer records what

was happening at the time. It is used to record state, rather than conditions, it can collect data from a large number of group members and to study the percentage of time consumed by activities.

B. The Observation Time and Tools

Using 8 x 40 binoculars, adopting the combination of instant scan sampling method (the observation time is separated into many short interval, 5 min is happening once, every 5 min record Black-crowned Night Heron behavior) and focal sampling method (observation records a Black-crowned Night Heron individual in a specific time interval), recording the observation period of Black-crowned Night Heron stand, rest, flight, feather, etc. To observe the accuracy of the observation, the observation time was set to 13:50-17:00.

The method of determining the behavior of the Black-crowned Night Heron: feeding means standing in the water or walking slowly and looking down to the surface of the water; feathering is a feather with a beak or foot; resting refers to standing with the beak and head under the neck or spreading its wings; walking refers to the displacement behavior that changes the stopping point without engaging in feeding behaviour; flighting refers to the flight of the flapping wing; standing refers to the

suspension of water or shoal, but not the action of feeding or resting.

C. Data Analysis

First is calculating the total number of behaviors that occur every day, and then calculating the total number of behaviors in the observation period, and the Excel is used. respectively from the various behaviors in the proportion of the overall behaviour of the Black-crowned Night Heron habitat in the behavior of time allocation, rainy days of Black-crowned Night Heron action time distribution and the influence of human factors on the influence of the distribution behaviour of the Black-crowned Night Heron day time three aspects, and doing a preliminary analysis and discussion for the Black-crowned Night Heron behaviour time distribution in spring.

III. RESULTS AND ANALYSIS

A. Data of the Observation

From March 16 to April 13, the Black-crowned Night Heron was observed in the Xuanwu Lake of Nanjing for thirty consecutive days, and the data of the observation period were recorded in detail with the instant scanning sampling method. The total number of actions taken in 30 days is measured in table 1

Table 1 List of Times of Behavior Occurring for Thirty Consecutive Days

Date	Standing	Resting	Cleaning	Feeding	Walking	Flighting
3.16	15	12	6	1	3	1
3.17	16	12	5	0	3	3
3.18	12	8	4	1	1	4
3.19	16	13	5	1	2	1
3.20	14	13	7	1	2	1
3.21	15	11	8	1	2	1
3.22	15	12	6	0	3	2
3.23	15	12	6	1	3	1
3.24	16	13	5	1	2	1
3.25	16	12	6	0	3	1
3.26	16	12	6	0	3	1
3.27	15	12	6	1	3	1
3.28	13	13	8	2	3	2
3.29	16	13	5	1	2	1
3.30	16	13	6	0	2	1
3.31	15	11	8	1	2	1
4.01	16	12	5	2	2	1
4.02	16	13	5	1	2	1
4.03	15	11	8	1	2	1

4.04	16	11	6	2	2	1
4.05	16	13	5	1	2	1
4.05	15	13	6	1	2	1
4.06	14	14	5	2	2	1
4.07	15	12	6	1	3	1
4.08	16	13	5	1	2	1
4.09	14	13	6	1	3	1
4.10	15	13	4	0	3	2
4.11	16	13	5	1	2	1
4.12	15	13	6	1	2	1
4.13	16	12	5	2	2	1

In the records observations and statistical results of the Black-crowned Night Heron for 30 consecutive days action showed that the behavior of its standing percentage is the largest, followed by the rest, relative minimum percentage of flight and feeding habits, and it accounts for 3.46 percent and 2.64percent respectively (Figure 1).

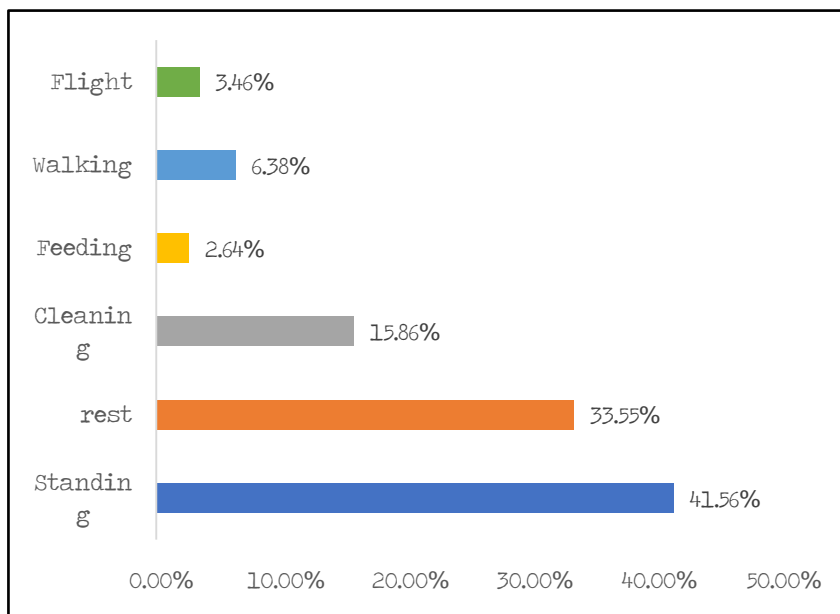


Figure 1 Percent of Times of Behavior Occurring for Thirty Consecutive Days

B. Behavioural Statistics of the Black-crowned Night Heron in each Period

For example, in March 25,you can see (figure 2), in the Black-crowned Night Heron day behavior in statistical work, it can be seen that the feeding, walking, flight ticket in the afternoon, and stand, rest and feather almost appeared at all time. Herons' feeding, flight and other behaviors appeared around 16:30 p.m.

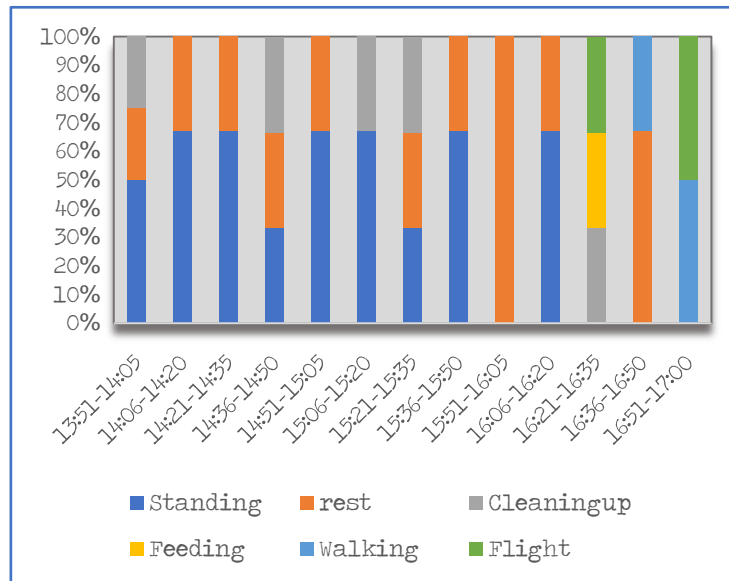


Figure 2 Behavioral Statistics of the Black-Crowned Night Heron in a Day

C. The Proportion Of Black-Crowned Night Heron Behaviour Occurring In Different Weather Conditions

On sunny days, Black-crowned Night Heron have the largest amount of time allocated for their behavior, followed by rest, while feeding and flying are the least. The proportion of food intake and flight behavior is basically the same, while standing and rest still account for the majority of the distribution of the nocturnal egrets (FIG. 3).

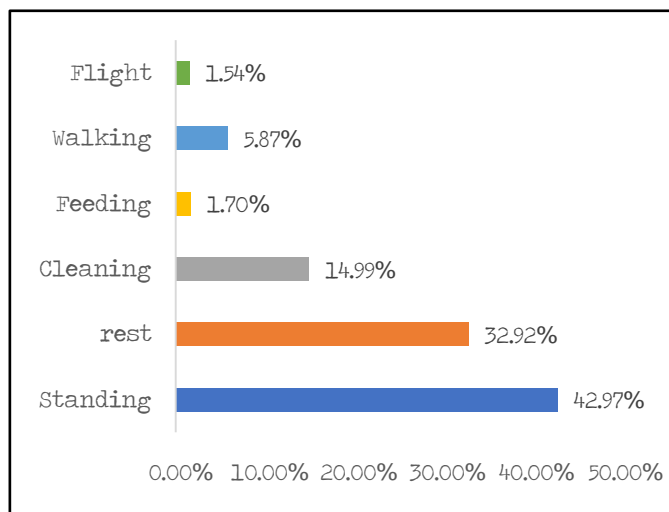


Figure 3 The Percent of Each Behavior of the Black-Crowned Night Heron on Sunny Day

On rainy days, Black-crowned Night Heron still have the highest proportion of time allocated for their behavior, followed by rest, while feeding is the least. Black-crowned Night Heron on a rainy day, at least for feeding behaviors and flying and manage the behavior of the feather the frequency increases, but standing up and rest of Black-crowned Night Heron behavior still for the most part of time distribution (figure 4).

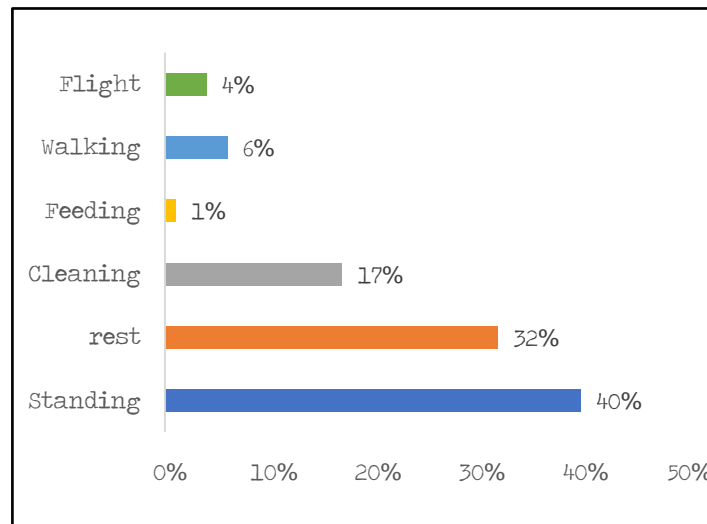


Figure 4. The Percent of Each Behavior of the Black-Crowned Night Heron on Rainy Day

IV. DISCUSSION

Birds behaviors time of allocation is an adaptation of the living environment, and it is a comprehensive performance of all factors affecting animal behaviors, it connects with food abundance [5], temperature, weather exchange factors ,and so on [6].

A. The Diurnal Time Distribution of the Black-Crowned Night Heron

According to the data that we can see the habitat can make a great influence on the behavior of the time distribution the Black-crowned Night Heron [7], because of the food richness in Xuanwu Lake is not very high, the feeding behavior countermeasures of the Black-crowned Night Heron is a little less investment income feeding strategies, cost less energy per unit of time also get less food. [8] and winter is the non-breeding season, the Black-crowned Night Heron is more likely to save energy, the standing, resting behavior accounted for more than 60% of the total activity

B. Influence of Weather Conditions on the Behavior of the Time Distribution of the Black-Crowned Night Heron

The weather condition has a certain effect on the time distribution of the behavior, but it is mainly reflected in rainfall. In the case of rainfall, the Black-crowned Night Heron increases the time of the preening, which may be related to the humidity of the air and the humidity of the feathers, and the degree of correlation is still to a further study. However, in the case of rainfall, due to the visibility and other factors, the time of the Black-crowned Night Heron's feeding behavior is relatively reduced. At the same time, the author analyzed the comparison between sunny and rainy days, the proportion of various behaviors changed, and the time of the Black-crowned Night Herons was reduced slightly.

C. Influence of Human Disturbance on the Behavior of the Time Distribution of the Black-crowned Night Heron

Human disturbance on the Black-crowned Night Heron had a greater influence on the behavior of time distribution [11], Black-crowned Night Heron feeding behavior of high frequency time is always in the evening, we analyzed the reason for this is that people have to play around and cleaning staff within the lake fishing grass and cleaning utensils behavior lead to Black-crowned Night Heron flew out of homes. In the late afternoon, the decrease of human activity in the surrounding habitat led to the reduction of the influence of human behavior on the Black-crowned Night Heron, and the Black-crowned Night Heron was able to relax its vigilance and return to its perch and engage in feeding activities.

V. CONCLUSION

The behavior of spring Black-crowned Night Herons is mainly to stand and rest, and the sum of the two actions are more than 60 percent of all behaviors; other actions are low. Black-crowned Night Herons have different patterns of behavioral timing in both land and water habitats. On land, the main action of Black-crowned Night Herons is to stand (41.56 %), followed by rest (33.55 %) and preening (15.86 %), and the rest is lower.

The behavior of Black-crowned Night Heron is mainly divided into breeding behavior, feeding behavior, community behavior and spatial behavior. Behavior the time distribution is by temperature, weather conditions, human interference and other factors, among them the habitat and human disturbance are the main factors, the feeding behavior countermeasures of Black-crowned Night Heron is a less investment and less earnings of feeding countermeasures, in the non-breeding season, it will spend less time on foraging and spend more time on

rest, human activities directly affect the rest and feeding of the Black-crowned Night Heron.

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