

## Patterns of diurnal behavior of the species *Himantopus mexicanus* belonging to the Family Recurvirostridae, in the Estuary of Saint Paul - Santa Elena

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### Abstract

This study aimed to analyze the diurnal behavior of the Cigueñuela cuellinegra, *Himantopus mexicanus* in the area of the estuary of the Rio Grande in San Pablo, we rely on the determination of behavioral patterns as Protocol Blumstein (2006). 16 samples were taken, resulting in a total of 7 hours of continuous observation, in which 28 behaviors, grouped in 9 categories, it was found that individuals maintain their locomotion for 48% of their daily daytime activity, sound signals were recorded with 16 %, power 13%, 10% rest, social agonistic 4%, 3.5% alert, grooming 3%, not 1.5% and finally agonistic defecation less than 0.1%, at the beginning of the observation 28 individuals were counted and the end of sampling about 40 individuals, we found that the population is growing, also considering the nests are located nine habitat as spawning area, locomotion behavior is linked with the sound signals and feed mechanisms more frequently peck and insert is made because the area facilitates such activity.

**Estuary, patterns of behavior, habitat, *Himantopus mexicanus*, breeding area.**

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## Introduction

Scot and Carbonell in 1986, defines two types of habitat in the approximately 2500 km of coastline belonging to the Equator; the same which is represented by a dry zone (produced by the flow of Humboldt) and a wet zone characterized by a line of coast of mangrove, both being home to a large number of aquatic birds and marine, intimately related to wetlands freshwater or coastal-marine, particularly the species under study is located in any type of wetland, both in fresh water and salt.

The species is diurnal, but has also been seen in activity for the night, is sociable and congregatoria with other shorebirds in mixed groups. It feeds on the shores of the wetlands collecting insects with its peak fine and long, thanks to the long legs that possession can forage in greater depth than other shorebirds, frequently recorded swimming being its most common behavior the walk. Sometimes looking for food by moving the head and the peak horizontally or from one side to another within the water, in a similar way to the American Avoceta (American *Recurvirostrata*) [4, 5, 6, 7]. with a wide range of types of foraging the species found in the area of Rio Grande easy access to small crustaceans, arthropods, and even small fish that are caught during the changes of high tide and low tide [1].

The present study proposed to analyze the diurnal behavior of the Cigüeñuela cuellinegra (*Himantopus mexicanus*), because there are no specific projects on the ethology of this species in the area of the estuary of the Rio Grande River in San Pablo, observing a high anthropogenic impact, on the basis of the little existing information allowed us to obtain data relevant to the natural life cycle.

Which will serve as a basis for information for future conservation projects or reducing the impact that could lead to its habitat to intervene the human being, hence the importance of the study is reflected in set the behavior of the animal to external factors. To be a potential site for shrimp culture, has been modified its geography by excavation and construction of aquaculture pools. In the methodological aspect we rely on the determination of behavior patterns according to protocol (Blumstein, 2006). Referred to in (Iannacone, 2012), which we change by adapting it to previous observations 9 patterns of behavior that are categorized in 28 different activities. Figure 1.



**Figure 2** Interactions in pairs of *Himantopus mexicanus*.

Is reproduced at the age of two years between April and July (Cramp and Simmons 1977). The reproductive success is different every year depending on the environmental conditions, which is a reference to make profound studies on their behavior and relationship with their environment for their conservation.

This work has as main objective to study the patterns of the diurnal behavior of this species in habitats that have been modified by man. Because there are no specific data on the ethology of *H. mexicanus* in this sector of San Pablo.

The present study allows us to obtain relevant data of the natural life cycle of the crank handle cuellinegra, which will serve as a basis for information for future conservation projects or reducing the impact, which could lead to their natural habitat by the intervention of the human being, hence the importance of the study is reflected in evaluating the conduct of the day before animal external factors.

## Methodology

### Study area

The study area is located in the Province of Santa Elena, in the commune of San Pablo with around 0.095km<sup>2</sup> meters of expansion, limiting with structures of shrimp pools whose geographical coordinates are:

North: 2° 8'41.20"S, 80°46'52.45" or South: 2° 8'51.10"S, 80°46'32.07"O

this: 2° 8'48.44"S, 80°46'29.81" or West: 2° 8'44.78"S, 80°46'54.92"E



### Observation

We sampling twice per week in the mornings and in the evenings, each observation is made by stealth, no less than 30 meters because that couples are put alerts and then cannot observe its behavior in a natural way, recorded every one of its movements during 3 minutes minimum, in a period of 2 hours per day. We recorded the amount of individuals of the species *H. mexicanus*, to estimate its current population in the study area.

### Determination of behavior patterns according to protocol (Blumstein, 2006). Referred to in (Iannacone, 2012)

*Grooming*: Cleaning of the back feathers, the ave flips the head toward the back; cleaning of the feathers of the chest, the individual is standing and tilt your head in the direction of the chest and left his saliva on the feathers and accommodated his pen with the peak; cleaning the pens in the internal part of the fins, with one of the wings raised, the individual flips the head in the direction of the axilla, cleaning with peak; accommodation of wings, the ave gives a small jolt of your body to be able to accommodate the feathers of your wing; shakes the body, the bird gives a strong jolt of his body; stretches the wings, spreads its wings to be possibly An airy armpits or to the ventral part of your body; stretches the Pata, the ave stretches the pata sometimes together with the wing or independently, the fully extended, this occurs after a break.

*Locomotion*: Jump, the ave gives short hops near the edge of the Estero; run, travels tranches running sometimes with the wing glued to his body other with the separate wing of the same; walk, the ave performs walks in search of food; short flight, performs short flights in the form of flows landing near the initial point of flight.

*Food*: Eat, the ave da pecks to the ground, immerses its peak near the water in search of food.

*Rest*: pata raised, is a type of relaxation where the bird is resting with one leg raised, remaining a time well; sitting, another form of rest is when the bird sits and takes a break staying a considerable amount of time.

*Alert:* lifting of the head, when eating, lounging or walking lift the head and makes movements to toward different addresses semicircular; runs and flies. When notes something abnormal quickly agilita its steps and flies.

*Sonora:* screams long, birds emit loud sounds at the beginning and during the short flights; screams short, while walking or fed; cries warning, were observed in couple and breeding, when noticed our presence advised the chick with shouts short making the chick was hidden near clusters of earth.

*Defecation:* pause for a moment and excrete the stool.

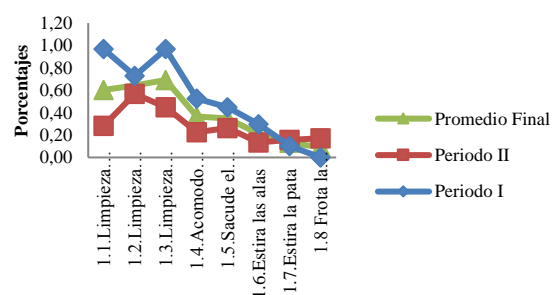
*Social competition:* persecution or attack from one individual to another, while walking near the shore attempt to attack an individual of another species after this performs a short flight and returns near the site.

No social competition: grouping approximation. While feeding are usually 2 or 3 individuals near the site of foraging.

## Results

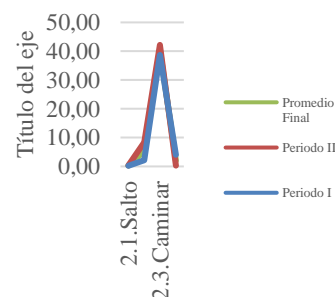
Were made 16 samplings, with a total of 7 hours of continuous observation, in which there were 28 behaviors, grouped in 9 categories (Table 3). With regard to the nine categories grouped it was noted that the individuals maintain their locomotion during the 48 per cent of its daily daytime activity, sound signals with 16%, supply 13%, rest 10%, social competition 4%, 3.5%, alert grooming 3%, no competition 1.5% and finally defecation less than 0.1%. To develop the etograma from (table 3) took into account the observation hours between 07h30 to 10h00 and 16h30 to 19h00.

Reviewing each of the categories of behaviors we have the first types of grooming in both sampling periods we determine that the cleaning of back feathers, chest and inner part of the wings but only in the first period with a percentage of 0.97, 0.73 and 0.97, respectively; while in the second half was 0.28, 0.57 and 0.45 in the same way, being these subcategories most representative of this type of behavior, (Figure 2).



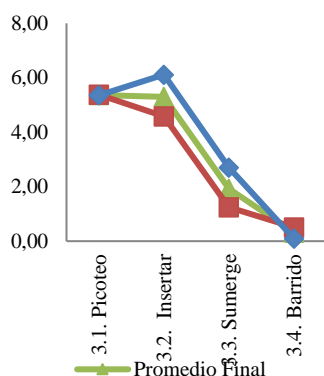
**Table 2** Frequency by categories of behavior - types of grooming.

In the case of mechanisms of locomotion we obtained the highest percentage for the subcategory walk with an average in the two periods which was of 40.55 %, followed by run with an average 5.41 % and lower values are those of jump and short flight below 2.5 %, in general in Ambo periods the dynamics was the same, (Chart 3).



**Table 3** Frequency by categories of behavior during the two sampling periods for types of locomotion.

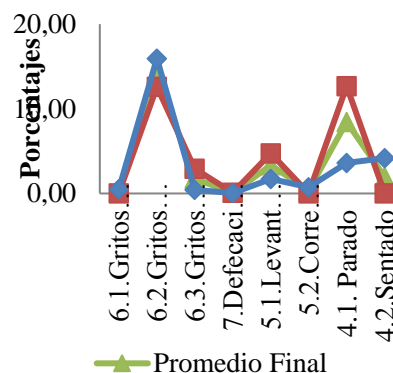
With regard to types of forrajeos (Chart 4), the first period presents a higher percentage with respect to the first, but without significant differences; in regard to those who were presented with higher activities were pecking and insert with an average of 5.30% both



**Table 4** Frequency by categories of foraging behavior (types of) in sample periods.

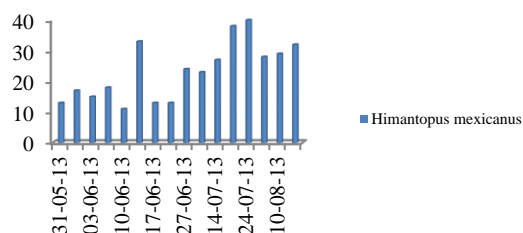
In the social behavior predominates the subcategory persecution or to attack another individual 7.44% in the first period, whereas in the second drops dramatically to a 0.64% This is due to the fact that the first cycle around 7 couples were in reproductive behavior according to the monitoring done. The other categories were not very representative with the exception of grouping and approximation with an average of 1.43% of the cycle muestral.

With regard to the categories of behavior several we have the greatest between the periods was shouting short constants with an average of 12.59%, the second of more incidence of activities behavior of rest stopped with 8.43% between cycles followed by lifting of head (3.32%), sitting (1.96%) and cries of viso (1.77%) were minimal in relation to the previous averages we mainly because they exceeded the 1 per cent of the total activities. (Figure 5).

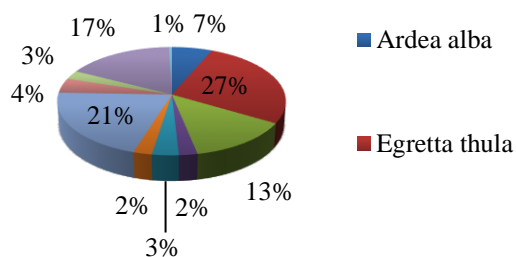


**Table 5** Frequency by categories of behavior (Miscellaneous) during the two periods of sampling.

The number of individuals at the beginning was 28 and at the end of the sampling was recorded 40 individuals, also identified 9 nests which gives us ensures that the habitat is an area of reproduction (Chart 6), in regard to the avifauna companion existed two species that predominated in the sector: Egretta thula (Garza nívea) 185 individuals that represents 27 per cent of the total population, Nyctanassa violacea (Night Heron) with 142 individuals coroniamarilla that reflect the 21% and Pelecanus sp. (Table 1 and Graph 8).



**Table 6** Abundance of individuals of Himantopus mexicanus recorded during all samplings in the area of the estuary of Rio Grande, San Pablo-Santa Elena.



**Table 8** Percentages of avifauna companion during the months of sampling.

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