



# The Study of Behavior *Heosemys Spinosa* on the Ex-Situ Conservation Area of Bengkulu University

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**Abstract.** This article describes the study of behavior on *H. spinosa* in ex-situ conservation areas at UNIB. Methods: The study used four individuals (1 female and 3 males) who were available in the conservation area. Research duration in 12 days (March-April 2021) with checking periods in the morning, afternoon, evening and night. Results: Observational data found 5 types of behavior, namely; Basking, Bathing, Sleeping, Resting, and Eating, Sexual behavior was not found. Conclusion: The behavior of *H. spinosa* shows a tendency of low mobility.

**Keywords:** Behavior · *Heosemys Spinosa* · Ex-Situ Conservation · Bengkulu University

## 1 Introduction

*Heosemys spinosa* (Gray, 1831) belongs to the endangered species (IUCN 2021) and is included in Appendix II but this turtle has still unprotected wildlife. Based on the IUCN red list still requires a lot of research for this species including species recovery and ex-situ conservation. The suspected population decline was also seen during the survey, this animal is quite difficult to find in nature. This species inhabits wet forests, rivers, hills, and lowland swamps.

*H. spinosa* which has dimorphism very clearly in distinguishing its genitals, males show a relatively flat carapace and on the plastron that appears sunken inside for the male but not so for the female [1]. The tail is relatively longer, with a larger base. In addition, males are clearly darker than females, while females show pink edges [2]. The largest-ever size was found with a Total Length (TL) of 275 mm; [3]. *H. spinosa* has the local name kura nanas (pineapple) or kura matahari (sun). This is due to the appearance when it is still a juvenile appearance that resembles the sun because the outer pieces of



**Fig. 1.** Daily behavior of *H. spinosa*; (a) Basking, (b) Bathing, (c) Sleeping, (d) Rest, (e) Mating, (f) Eating

the sharp carapace resemble thorns. The sharp puck will disappear with age and the size of the turtle. In Myanmar, this turtle is called the salak turtle because salak is part of its diet [4].

Turtle conditions are difficult to find in nature but still have a high catch quota until 2000 individuals [5], in 2004 (1800 individuals) and decreased 2010 (450 individuals) [6]. This land turtle is spread across Sundaland from peninsular, Thailand, Malaysia, and southern Myanmar and across to Indonesia, Philippines and [7]. In Sumatera turtles are spread throughout the province from Aceh to Lampung and even Mentawai Island [8].

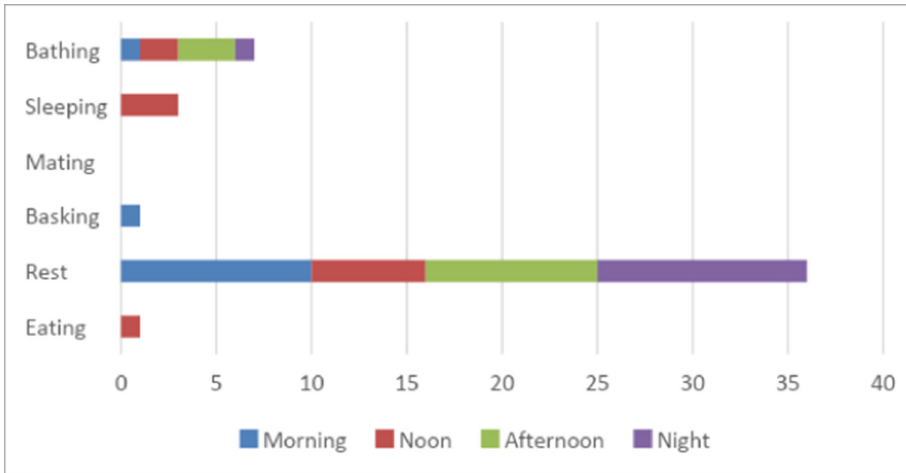
## 2 Method

Observations of the daily behavior of *H. spinosa* turtles in the conservation area of the University of Bengkulu using 4 individuals (1 Female, 3 Males) were carried out for 12 days (March-April 2021) which were divided into 4 times, namely in the morning, afternoon, evening and evening. The observed behaviors are eating, rest, sunbathing, sexual, sleep, and bathing (Fig. 1). Environmental support data is measured to look at abiotic factors during observation.

## 3 Result and Discussion

### 1) Eating Behavior

The feeding time of *H. spinosa* turtles at the time of erratic observation is during the day at 12:00 or in the afternoon then there is no significant relationship between time and eating behavior. *H. spinosa* forage in feed places are often laid. This food source is in the form of bananas and papaya fruit and plants in the form of taro leaves and other herbaceous plants that grow in the area. They eat by sticking out their necks and eating



**Fig. 2.** Graph of *H. spinosa*'s daily behavior in 12 days of observation

the fruit and its skin can be seen in Fig. 1(f). After full turtle *H. spinosa* immediately rests under litter or bushes. The rest of the food is left in the feed. There is no event of feed grab because the amount of feed given is quite a lot. Eating activities will continue without a definite schedule. *H. spinosa* is a pure herbivorous animal according to [9]; [10] but now tends to group it in omnivores. Eating behavior according to nutritional needs will be healthy if balanced between fruits, vegetables and protein. In nature they can find food in the form of vegetables and fruit and can add protein in the form of snails, worms, carcasses, insects, fungi and even animal bones. Even in feed for protein can be by giving rat babies or cuttlefish bones [3] (Fig. 2).

## 2) Rest Behavior

In this study the most common behavior is rest. The rest time of *H. spinosa* turtles is erratic, they can rest in the morning, afternoon, afternoon or even evening. The characteristics that appear at rest *H. spinosa* will not do any activity. Usually *H. spinosa* turtles resting under litter or dried leaves can be seen in Fig. 1(d). Its function is to protect the turtle from the threat of predators or humans. *H. spinosa* is a turtle that spends a lot of time resting. According to [11], turtles like to hide in a place that is completely protected so that it feels safe in that place. The behavior of this animal does tend to be difficult to measure the behavior of routine because a lot of the time is used to rest by hiding under the shade/litter [3].

## 3) Basking Behavior

*H. spinosa* sunbathing behavior is usually done at the time after the turtle eats, the sunbathing time for this turtle is in the morning before noon around 10:00 pm when the heat of the sun is enough to be seen in Fig. 1(a). Sunbathing maintains the cleanliness of the shell; sunbathing is also good for the strength of the turtle shell. According to

[12], this aims to strengthen the shell, increase endurance, help the digestive metabolic process, and synthesize calcium for bones and shells. The components needed when basking in the sun for turtles are UV-A and UV-B.

#### 4) Mating/Reproductive Behavior

Mating behavior in *H.spinosa* turtles is not observed because at the time of observation *H.spinosa* turtles have not entered the breeding season. The turtle mating season occurs during the rainy season, when the *H. spinosa* turtle rains more actively. Usually, when it has entered the breeding season, male turtles become more aggressive or more active than usual. The male becomes unsettled and walks more often in his territory. The mating pattern of *H.spinosa* turtles is known to be stimulated by rain. Female sun turtles can breed up to three times a year, producing two or three eggs in one breed. [13] explained that turtles breed like other animals, namely the male does more movements to attract the attention of the female, when the breeding season arrives the behavior of the male turtle will walk after the female turtle, then the male turtle removes its head and neck to kiss the tail of the female turtle, In addition there is also behavior such as the back body of the male turtle raised, the tail came out quite long, and the road became faster than usual. This is done to attract the attention of female turtles. During the mating period, the male turtle will do so until there is a female turtle that feels attracted and begins to follow the male turtle. Mating behavior has been found in the area outside of observation, the event found is the male riding the female and the beat when mating sounds loud “plakk” that is the collision of male plastron on the female carapace and this occurs only a few minutes. Then the male moves away from the female. The same thing happened to the observations at Durrell Wildlife Conservation Trust [3].

#### 5) Sleeping Behavior

The sleeping behavior of *H.spinosa* is seen where these turtles are under dry foliage (litter) to get a comfortable and safe position when sleeping. The position that appears during sleep *H.spinosa* looks close to the eyes, then some insert and do not put the foot into the carapace, some like/do not put the head into the carapace seen in Fig. 1(c). Sleep behavior during observation occurs during the day to evening. [12] explains that all wildlife usually marks its territory or territory with urine, as do turtles. Turtles carry out their daily activities in their territory or territory as well as outside or around their territory. Usually, the territory is characterized by urine, feces, and also footprints. The place to sleep a turtle is usually a dark, slightly damp place, and hidden under foliage or shrubs.

#### 6) Bathing Behavior

The behavior of bathing *H.spinosa* at erratic times can be morning, afternoon, afternoon even at night. The bathing position of this turtle is that there are some turtles that when bathing their heads are lifted slightly and the body is sunk to the bottom of the tub seen in Fig. 1(b), but there are also turtles that only drown half of their body and their head looks up. Bathing to keep the body temperature stable considering that turtles

**Table 1.** Abiotic condition data

Intensity of light	Soil pH	Soil Humidity	Air Humidity	Soil Temperature	Air Temperature
3466	6,4	73%	77%	27 °C	28 °C

belong to reptiles that are poikilothermic which is characterized where the body temperature is not fixed, but changes with the environmental temperature [14]. Turtles like moist places because humid temperatures can adjust to their body conditions while for dark dry places turtles use to rest during the day (Table 1).

Data on abiotic conditions in the *H.spinosa* environment of observation activities in March–April 2021 observed abiotic conditions in the data table above. Based on data on abiotic conditions can be seen light intensity conditions of 3466 lx, with a soil pH of 6.4, soil moisture of 77%, air humidity of 77%, soil temperature of 27 °C, and air temperature of 28 °C.

## 4 Conclusion

The daily behavior of *H.spinosa* shows this animal has a little mobility.

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