Study of The Potential Deer Breeding (*Rusa timorensis* and *Axis axis*) Tourism at West Java

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Abstact. Deer is one of the wild animals that has many benefits that currently crisis because increasingly rare population that is now starting to decrease due to damage. This research is expected the management of captive can improve the management of captivity so the deer can survive on the cage so as to avoid extinction. The research was carried out using a descriptive method with a cross-sectional are interviews with the manager and keeper of the breeding at Wana Wisata, Kebun Raya Bogor, Jbound and Perum Pertamina. The results of interviews there are 8 spotted deer and 6 timor deer in Wana Wisata, 700 spotted deer in the Kebun Raya Bogor, 25 timor deer in Jbound and 4 timor deer in Perum Pertamina. The captive breeding at the 4 locations of the deer has its own charm and becomes an attractive tourist attraction to be visited and has the potential to increase the economic value and ecological value for the preservation of the deer in order to avoid extinction. This research is expected to be a reference for captive managers to obtain information about the potential for deer breeding so that they can attract tourists with improved management and infrastructure.

INTRODUCTION

Conservation is one of the most important factors in maintaining all life in the universe, both flora and fauna, which over time is increasingly threatened by both natural and artificial factors (Supriatna, 2014; Ramaidani, et al., 2021). Deer are a herbivores animal there has many uses and most species are seasonal breeders (Lincoln, 1992). Leather, velvet, antlers, testis, and offal of *Rusa timorensis* can also be used as medicine and handicrafts (Takandjandji, et al., 2011; Sofyan, 2018). Only the purpose of maintenance is still very simple, namely as pets (exotic). The utilization of venison should be carried out in accordance with the principles of sustainable ecological agriculture (Kuba, et al., 2015). As for deer, it still depends on hunting activities . So actually in Indonesia itself, the use of deer has long been known, it just needs further targeted development (Putri, 2002; Semiadi, 2004). Hunting is a human instinct that has existed since prehistoric times. However, illegal hunting activities threaten the sustainability of wildlife species, either directly or indirectly (Thohari, 2011). On the IUCN, timor deer enters the status of “vulnerable” and spotted deer enters the status of “least concern”. According to Law No. 5 of 1990 "Regarding the Conservation of Biological Natural Resources and Their Ecosystems, wild animals are all animals that live on land, in water and in the air that still have wild characteristics, both living freely and those that are kept by humans" The captive program has the aim of maintaining wild species of flora and fauna that are threatened with existence and their sustainability due to several factors (Departemen Kehutanan, 1990). With this captivity, it is hoped that this can be one of the right ways and steps so that wild animals, especially deer, can continue to be sustainable and avoid extinction. This research has the following objectives: 1. Can describe the conditions of captive management of

Timor deer (*Rusa timorensis*) and spotted deer (*Axis axis*) in West Java. 2. Can explain the analysis of potential management and challenges that arise in captive breeding of Timor deer (*Rusa timorensis*) and spotted deer (*Axis axis*) in West Java.

MATERIALS AND METHODS

Time and Schedule

The research was carried out from October 2021 until January 2022 in 4 breeding locations in West Java. The research locations consist of Wana Wisata, Kebun Raya Bogor, Jbound, Captivity in Cilamaya.

Tools and Materials

The instrument used in the research consists of: camera for documentation, meter, stationery, questionnaire, laptops and research questionnaire.

Procedure

Description method is a method used to provide an objective description of a situation. The cross-sectional approach is a study by studying the correlation between risk factors by means of approaches, observations, or data collection (Notoatmodjo, 2012).

RESULT AND DISCUSSION

Deer Population in Deer Captivity in 4 Breeding Locations in West Java

TABEL 1. Deer Population in Deer Captivity in 4 Breeding Locations in West Java

No	Deer Breeding Location	Arae	Deer Population		Spotted Deer (*Axis axis*)		Timor Deer (*Rusa timorensis*)	
			Spotted Deer	Timor Deer	Female	Male	Female	Male
1	Wana Wisata	± 8,4 Ha	8 individuals	6 individuals	2 adult & 2 fawns	2 adult & 2 fawns	2 adult	3 adult and 1 fawns
2	Kebun Raya Bogor	± 28 Ha	700 individuals		700 individuals for male and female deer on breeding place			

3	Jbound	± 1,5 Ha	25 individuals	11adult and 2 fawns	11 adult and 1 fawns
4	Pertamina, Cilamaya	± 2 Ha	4 individuals	4 individuals	

In the table above is a table of the population of deer in each deer captive in 4 locations in West Java.

1. Deer Breeding in Wana Wisata

Timor deer have a length of approximately 107-136 cm. The number of Timor deer consisted of 2 adult females and 3 adult males and 1 male fawns. Spotted deer have a length of approximately 100-120 cm with the number of spotted deer consisting of 2 adult females, 2 female fawns, 2 adult males and 2 male fawns. Both weigh approximately 80-120 kg. The deer given feed until 3 times a day. The food given to the deer consists of elephant grass, dedak (chicken food as an additional protein), carrots and other green plants that grow in the cage area. Deer is one animals that feel hungry at everytime (Afzalani, 2008; Mutmainnah, 2021). Deer have a relatively infrequent habit of drinking and licking salt to neutralize the tongue and as an antidote. So that a block of salt is provided in the cage for the deer. Deworming is given to deer every 3 months.

2. Deer Breeding Kebun Raya Bogor

Spotted deer have a length of approximately 100-120 cm. The number of spotted deer, both male and female, currently consists of 700 spotted deer (*Axis axis*). With a possible weight of about 50-80 kg deer. The deer given feed until 3 times a day. The food given to spotted deer consists of elephant grass, sweet potatoes and green plants or other grasses that grow in the presidential courtyard area. In the deer cage area, there is a very wide expanse where spotted deer are free to move here and there to play, interact with fellow deer and occasionally approach visitors along the fence where the deer are. Health checks are carried out regularly in collaboration with LIPI, Bogor.

3. Jbound Deer Breeding, Bogor Nirwana Residence

Timor deer in captivity have a length of approximately 120-130 cm. The number of Timor deer consisted of 11 adult females, 2 female fawns, 11 adult males and 1 male fawns. The deer given feed until 3 times a day. The food given to the deer consists of elephant grass, carrots and other green plants that grow in the cage area. Deer have a relatively infrequent habit of drinking and licking salt to neutralize the tongue and as an antidote. So that a block of salt is provided in the cage for the deer.

4. Pertamina Deer Farm, Cilamaya

Timor deer in captivity is estimated to have a length of approximately 100-110 cm. The number of Timor deer consists of 4 adult females but no male deer. The deer given feed until 3 times a day. The food given to the deer consists of elephant grass, carrots, and other green plants that grow in the cage area. In deer captivity in Pertamina Perum, there used to be quite a lot of deer, which was around 97 deer. Over time, many deer fled to residential areas and roads so they were secured. This happened due to the tragedy of the collapsed fence, therefore the guard was strictly enforced.

Facilities and Infrastructure at the Deer Breeding Location

TABEL 2. Facilities and Infrastructure at the Deer Breeding Location

No	Wana Wisata	Kebun Raya Bogor	Jbound	Pertamina, Cilamaya
1	Cage of Deer	Cage of Deer	Cage of Deer	Cage of Deer
2	Canteen and Booth of food and Beverages	Spacious yard and fence	Other animal enclosures (goats, birds, guinea pigs, hedgehogs, etc.)	Parking Area
3	Booth of Souvenirs	The seats around the fence	Bridge	Free area to visit with seller
4	Camping ground		Booth of Souvenirs	
5	Photo Spot		Canteen and Booth of food and Beverages	
6	Playground		Toilet	
7	Toilet		Prayer Room	
8	Prayer Room		Parking Area	
9	Bridge		Camping ground	
10	Parking Area		Flying fox	
11	Counter		Playground	
12	Booth of Deer Feed		Event stage	
13	Guest House		Ball Bath	
14			Ball Water	
15			Breeding of Bee	
16			Counter	
17			Duck Boat	

18	Booth of Deer Feed
19	Photo Spot

The table above is a table of deer breeding facilities and infrastructure.

1) Facilities and Infrastructure for Deer Captivity in Wana Wisata

Apart from deer breeding, there are other facilities at Wana Wisata to increase the interest of tourists when visiting. Such as food and souvenir stands, toilets that are easily found, camping ground and equipment such as tents, swings, prayer rooms, children's playgrounds, bridges, parking lots, providing sales of deer feed, lodging, borrowing hammocks, etc. cool and many more places that can increase the tourist minal combined with beautiful natural scenery and clear rivers surrounding the tourist area. Wana Wisata Cariu Bogor is one of the most popular tourist destinations in the Bogor area. The average visitor every day is more or less than 300 people. This tour has been established for a long time and is quite well known in the community and on social media. The manager of Wana Wisata Cariu Bogor is an active person in introducing this tourist spot on social media, both TV stations, Instagram, Facebook, websites, etc. This tourist area is located in a strategic location between Bogor and the direction of the peak of Ciawi. So that many visitors stop by and visit this tourist spot. This tourist spot is open every day from 07.00-17.00 and the ticket price is affordable, which is only Rp. 10,000.

2) Facilities and Infrastructure for Deer Captive in Kebun Raya Bogor

Facilities and infrastructure at the deer captivity in the Kebun Raya Bogor are cages consisting of a wide expanse where deer are free to roam in the presidential environment, precisely in the palace courtyard. The deer are on a wide expanse which is surrounded by a fence that surrounds the entire breeding area. Deer have 2 types of cages, namely closed and open cages, open cages in the form of a wide expanse of grass planted with various types of plants for the deer to run, walk, sunbathe and other activities and inside there is a river for the deer to bathe and drink and play. Visitors who want to see deer can approach around the fence where the deer are kept and along the fence provided seats and trash cans for visitors who come and want to feed the deer. However, visitors can only be outside the enclosure area or around the fence, because not just anyone can enter the palace courtyard, therefore it is closely guarded by the TNI and other presidential security forces. The wide yard of the deer breeding in the Kebun Raya Bogor is very well known on social media, both TV stations, Instagram, news channels, websites and many more. The deer in the Kebun Raya Bogor is an icon of the city of Bogor and has become a symbol of the city of Bogor (Andini, et al., 2022). Deer in the Kebun Raya Bogor have been widely distributed to all areas to be bred and bred for conservation purposes. Deer breeding in the Kebun Raya Bogor is one of the most successful deer breeding programs because it has produced a lot of deer and has been conserved in several areas for breeding and

conservation. This breeding is open every day indefinitely but can only be outside the palace area, namely around the breeding fence.

3) Facilities and Infrastructure for Deer Breeding in Jbound, Bogor Nirwana, Residence

Jbound itself is a natural tourist spot in the Bogor area with various tourist options such as deer breeding and other animal breeding such as goats, geese, rabbits, guinea pigs, and other animals, then other playgrounds such as flying fox, walking in a ball, ball bathing, camping ground, stage tours, selling souvenirs, prayer rooms, toilets, parking lots, playgrounds, beekeeping, counters, providing sales of deer feed, interesting photo spots and much more. The many choices of tours at Jbound BNR make many tourists flock to come and enjoy their vacation. Deer breeding is one of the most popular objects for most people, because apart from being able to interact with the deer directly, visitors can also feed the deer and take photos with the deer themselves. Deer breeding at Jbound BNR is a deer breeding with a strategic location in the residential area of Bogor Nirwana Residence where the location is easily accessible so that many visitors come with their families. The atmosphere in Jbound is a suitable atmosphere for residents in urban areas who want to go on vacation with nature that is still beautiful but the time is tight so that Jbound is a tourist spot that is often visited by tourists both from the city of Bogor or outside Bogor. Deer breeding at Jbound BNR is one of the most popular tourist destinations in the Bogor area. The average visitor every day is more or less than 200 people. This tour has been around for a long time since 2007 and is quite well known in the community and on social media. In addition to captivity, this tourist area is included in a strategic location in Bogor. So that many visitors stop by and visit this tourist spot. This tourist spot is open every day from 09.00-16.30.

4) Facilities and Infrastructure for Deer Breeding at Perum Pertamina, Cilamaya

Facilities and infrastructure for deer breeding at Perum Pertamina, Cilamaya has a deer cage, a large yard so that visitors can visit and a large area is free to visit with street vendors so that visitors can be comfortable and buy food. In this deer captivity, visitors are only allowed to see from outside the fence because this captivity is in a residential area. So visitors can freely see the deer without the need to buy an entrance ticket. The average visitor every day is more or less than 40 people.

Deer Captive Management Challenges in 4 Breeding Locations

TABEL 3. Deer Captive Management Challenges in 4 Breeding Locations

No	Challenge	Wana Wisata	Kebun Raya Bogor	Jbound	Pertamina, Cilamaya
1	Development of Facilities and Infrastructure (Facilities)	Good	Good	Good	Needs to be improved
2	Quality of Natural Resources	Good	Good	Good	Needs to be improved
3	Deer Quantity in Captivity	Verry Good	Verry Good	Good	Needs to be improved
4	Source of funds	Good	Good	Good	Good
5	The beauty of natural resources	Verry Good	Good	Good	Good
6	Illegal hunting	Protected	Verry Protected	Protected	Protected
7	Natural disasters	Protected	Verry Protected	Protected	Protected
8	Forest fires	Protected	Protected	Protected	Protected
9	More Recreation Options	have lots of recreation	No have of recreation	have lots of recreation	Needs to be improved
10	Environmental Hygiene	Good	Verry Good	Good	Ungood
11	Located of Deer Breeding	Easy to acces	Easy to acces	Easy to acces	Easy to acces
12	Condition of cage	Good	Verry Good	Good	Ungood
13	Research Permition	Easy	Hard	Easy	Easy

In the table above, the challenges of deer breeding management in 4 captive locations are to improve the welfare and population of deer and increase tourist interest.

1) At the deer captivity at Wana Wisata, there is a good development of facilities and infrastructure where the available facilities such as toilets, prayer rooms, canteens, etc. are adequate, have quality human resources

who are experienced in managing deer breeding, the quantity of deer or the number of deer is 8 for deer spotted and 6 individuals for Timor deer, including sufficient for breeding, managers and investors work together in breeding deer so that the source of funds is still safely fulfilled in management, the natural beauty of the captive area is very good so that tourists are interested in visiting, the captive area is kept protected and maintained From forest fires, recreation options are quite varied, breeding locations are kept clean and captive locations are easily accessible as well as good deer enclosure conditions so that deer can live comfortably.

2) The deer captivity in the Kebun Raya Bogor has developed good facilities and infrastructure where facilities are available such as public seating along the fence of the Presidential Palace, lush vegetation, neat and clean roads around the captivity, quality human resources who are experienced in managing deer breeding and strictly guarded by special staff, the quantity of deer or the number of deer as many as 700 spotted deer are very adequate for breeding, the source of funds comes from the government so that the breeding needs will always be met, the natural beauty is quite good in the captive area so that tourists are interested in visiting, the area captivity that is still protected and protected from forest fires, there are no recreational options available because it is strictly guarded by state security officers and special staff.
3) The deer captivity in Jbound has good facilities and infrastructure development where facilities are available such as toilets, prayer rooms, honey breeding, feeding various animals such as birds, goats, guinea pigs, etc., canteen and stands, places to sit and relax, etc., have quality human resources who are experienced in managing deer breeding, the quantity of deer or the number of deer as many as 25 Timor deer including very adequate for breeding, sources of funds for captive management will always meet their needs, the natural beauty is quite good and beautiful in the residential area of Bogor Nirwana Residence so that tourists are interested in visiting, captive areas that are still protected and protected from forest fires, varied recreational options are available, namely camping ground, flying fox, ball bathing, walking in balls, duck boats, tourist stages, etc.,
4) In deer breeding at Perum Pertamina, Cilamaya has poor development of facilities and infrastructure where the available facilities are not adequate, the fence of the breeding area is starting to be damaged and must be improved with repairs, has the quality of human resources that must be improved in order to better manage deer captivity, the quantity of deer or the number of deer is only 4 female Timor deer which is not adequate for breeding so it is necessary to add the type of male deer, breeding locations are not kept clean due to lack of strict regulations so that visitors who come do not participate in protecting the environment so that it will affect the welfare of the deer and the location of the captivity that is easily accessible and the condition of the deer enclosure is inadequate so that it must be improved again.

CONCLUSION

The results of this research it can be concluded that:

1. The challenges that occur in captive deer in this study are that Wanawisata is in a protected area, in Kebun Raya Bogor namely the limited range of visits for visitors because it is strictly guarded by special staff so that it can only be outside the captive area, in Jbound there is a lack of planting vegetation in the captive area to increase deer productivity, at Perum Pertamina there is a lack of rules to protect the environment around the captive area.
2. The use of Timor deer (*Rusa timorensis*) and spotted deer (*Axis axis*) in West Java has not been well coordinated, so that the economic benefits cannot be estimated because the propagation of individual deer is mostly unsuccessful.
3. The number of deer that has a large population, namely in deer captivity at the Kebun Raya Bogor, is also not well coordinated, so that a lot of valuable information cannot be obtained. The existence of deer in the Kebun Raya Bogor is clearly a lot to fulfill the aesthetic value or beauty of the presence of the Presidential Palace there.
4. Likewise, the use of deer in most of the natural tourism areas studied does not show a breeding business for consumption of marketable meat (economy), but rather as a natural tourist attraction and fulfillment of aesthetic values.
5. This research is only limited as information about deer breeding efforts in 4 locations in West Java (Indonesia) which basically have not been implemented properly. Further research is needed to look at the conservation permits that are supported by the government for managers in the context of deer development.

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