

Timor Deer Captivity Using Cage System

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ABSTRACT

The aim of this cultivation of Timor deer captive using cage system was to preserving one species of deer in Indonesia [conservation purpose], providing Science and Technology about Timor deer captivity using cage system [technical, administration, management product of follow up result in supporting the development of the breeding], providing captivity facilities, production service for the Timor deer captivity and other consumer to meet parent stock needs which is has the certificate, providing research facilities, education, tourism, provide job for societies' in around. Target of Timor deer breeding using cage system is implementation get knowledge technology and science about breeding Target of Timorese deer captivity using cage system is being implemented and get knowledge about efficient and effective breeding system to invite the user to adopt technology that created. The method used in this study was survey and observation at the Timor deer captivity area. Conclusions of Timor deer captivity using cage system is Timor deer [*Rusa timorensis*] are easy to be captive because their adaptability to environments outside their habitat is quite high. This method can be used in small quantity.

Keywords: Timor deer; captivity; cage system

INTRODUCTION

Deer in Indonesia is still wild animal that protected by law. Based on government regulation no. 7 of 1999, 27 January 1999 concerning Preservation of Wild Plant and Animal Types. Meanwhile, the International Union for Conservation of Nature and Natural Resources [IUCN] in 2007 classified the Timor deer as a type with a category of low risk/low concern, then in 2008 it was increased to vulnerable [vulnerable] [Hedges et al., 2008]. However, based on the CITES Convention [Convention on International Trade in Endangered Species of Wildlife Fauna and Flora], the status of Timorese deer is not included in the list where quotas are regulated [Forestry Department, 2006].

Timor deer is one of Indonesia's potential natural resources that needs to be protected. This potency can be utilized while pay attention to its sustainability elements. However, if deer continue to be hunted without efforts to preserve them, one day they will become extinct. Moreover, habitat destruction due to population growth tends to increase, as well as shifting farming patterns also causes a decline in deer populations in the nature.

Deer captivity is an effort to reproduce through breeding and rearing outside the natural habitat [ex-situ] while maintaining the purity of the species. The results of breeding are utilized in the form of the first offspring [F1] which can be transferred to other breeders as parents, while the second offspring [F2] and so on can be traded.

Generally, captivity is carried out on a small scale with a confined system or cage system in a limited area. Timor deer captive has been carried out by government, private, as well as society with various aims and interest conducted traditionally, semi-permanently and permanently.

METHODS

The method used in this study was survey and direct observation at the Timor deer captivity area included captivity system, location of captivity, facilities of captivity, captivity technique, fence and pens maintenance, feeding techniques, and feed management.

FINDINGS AND DISCUSSION Captivity System

Deer captive is generally divided into three [3] systems, namely the confined system [cage or paddock], semi-enclosed [mini ranch], and free system [ranch]. Determining a captive breeding system depends on the availability of funds or costs, land area, labor, and breeding objectives [Takandjandji, 2009].

The confined system is carried out by keeping deer in an area surrounded by fence and feed is provided from outside by cut and carry. Deer in a confined system are completely dependent on human intervention. Minimum land area used for the cage system is 0.5 ha or as needed.

Semi-enclosed system is conducted in a form of a mini ranch by captive in a large area [\pm 1.0 ha], fenced, and deer are allowed to graze, but sometimes feed is supplied from outside if feed in the area is insufficient. Free system [ranch] is a deer captive system that is carried out extensively in large and fenced area [\pm 1.0 – 5.0 ha or depending on area availability and captive purposes]. Deer are allowed to graze naturally without human intervention except to control and regulate carrying capacity.

Captivity deer with ranch and mini ranch systems should meet the needs of life according to their natural habitat.

Therefore, artificial habitat in fenced captive enclosures can be provided with areas of trees and shrubs, water sources, feed area and pasture. Treed areas are very useful for shelter and bedding, while bushy areas used as a place for rest, childcare and other biological needs. Types of trees planted have fairly shady crowns as shade, and various other types of forest plants whose skins are often eaten. Therefore, it is necessary to fence several tree species if there is concern that they will quickly deteriorate or die because deer eat their skin. Tree fencing is done as high as 1-2 meters using bamboo, wood or harmonica wire. If natural shading is deemed insufficient, artificial shelters can be made with a height of 2 meters from non-perishable materials with the number and placement of separate shading as needed. The cages needed in cage system breeding are:

- Breeding cages [closed cages measuring 6 x 2 m² and partitioned into three rooms namely for mating cages [2 x 3 m²], birthing and breastfeeding cages [2 x 1.5 m²] and weaning cages [2 x 1.5 m²],
- Individual and research pen [each measuring 2 x 2 m],
- Transit pen [open house of ± 560 m² to accommodate newly arrived deer],
- Rearing pen with area of ± 288 m² divided into 4 [four] sub-units each measuring ± 72 m² for pair selection, fawn rearing and training [exercise] for one of the pairs to freshen up the body condition in breeding cage, as well as an isolation place for certain cases.
- Yard, usually round or circular shape used for the fawn treatment, and a place for pregnant and birth deer. Yard fence walls are made of strong boards with a minimum height of 2.0 m, and are hermetically sealed to allow deer to be easily handled without causing panic or stress. The cage is round so that it is easier to treatment because deer will be in the middle of the cage. However, if the cage is square, deer tend prefer to be in the corners, making it difficult to treat them. The cage floor consists of a rough floor and paving blocks.
- Feed warehouse [permanent building measuring 8 x 6 m² which is used as a warehouse for feed, medicines and captive breeding equipment],
- Information centre [permanent building measuring 10 x 6 m² for deer breeding data and information centre as well as administration and training activities].

The feed area must be easily accessible by staff which providing the feed, and its placement allows deer to eat from all directions. The feed area is shaded to preventing the feed from drying out easily due to heat or getting wet due to rain. If a large number of deer are bred in one breeding area, feeding stations can be made in several places to prevent competition for food between individual deer. The size of the feed is adjusted to the number of deer kept. Floor where the feed can be made of cement or boards. Feed bins in the form of stilts will reduce the remaining feed that is wasted due to being trampled or mixed with faeces [faeces and urine].

Location of Captivity

Several requirements that need to be considered when determining a deer captive location include being outside a natural reserve area; located in a quiet place; safe from interference; easy to reach during the rainy season and dry season; there is plenty of water available throughout the year for drinking, cleaning cages, watering feed, and for wallowing; flat to lightly undulating topography; minimum land area of 0.5 ha and/or as needed; isolated from the influence of other animals or livestock; smooth textured soil surface, not coral; provided shade trees or shelters because deer need shelter and protection from heat or rain; and easy to get forage that used as feed.

Facilities of Captivity

According to Takandjandji & Sutrisno [2006], the facilities and infrastructure required for captivity Timorese deer using a cage or cage system were:

1. Cage

The cage serves as a shelter from rain, heat, and predators; places to shelter, rest, reproduce, eat and drink; care for the sick; and to make it easier to control.

The cage materials used consist of wood, nails, iron, harmonica wire or ram, bricks, cement and sand. Concrete pillars are built on foundations with the cage size for one adult deer being 2.0 m². Deer cages are provided with doors, so that they are easy to handle for feeding, catching for weighing, measuring, marking, health checks, or providing treatment. The drainage on the floor of the cage is made at a slight angle and made sure it is not muddy; Deer pens should be partitioned according to physiological status.

Deer pens consist of various forms depending on their use, including shade structures. This building functions as a shelter because it has a roof and walls so it is protected from exposure to rainwater. This building is very necessary in deer captive which uses a confined system [cage]. The roof of the building consists of tiles, thatch or thatch, while the walls are made of brick with a minimum height of 50 cm. The building measures 1 m² for one adult deer. Deer breeding that uses a free system [ranch] can use shady trees or bushes.

2. Fence

A fence is made around the breeding area and the materials are fence posts [iron, concrete, or live trees] and wire [harmonica or ram, barbed wire]. The minimum fence post height is 2.5 m from the ground surface, planted 50 – 75 cm with a concrete foundation and the top end bent 0.5 m long and given 3 – 4 rows of razor wire. The maximum distance between fence posts is 2.0 m. Fence posts made from living trees are planted around the fence at a height of 2.5 m from the ground with a minimum trunk diameter of 10 cm and planted 50 – 75 cm apart. Live trees were planted between the angle iron posts, to help strengthen the fence.

3. Feed development area

The feed development area is one of the most important facilities in captivity because deer productivity and breeding are very dependent on feed. Therefore, it needs to be managed intensively to maintain the quality and quantity of feed types. The type of food planted is adjusted to the types preferred by deer, resistant to drought, consisting of types of grass [poaceae] and legumes.

Deer feed in the form of forage, both types of grass, vines and leaves, and additional feed [concentrate]. Forages include elephant grass [Pennisetum purpureum], king grass [Pennisetum purpuroideum], setaria grass [Setaria sphacelata], sorghum, and field grasses such as kolonjono [Heteropogon polystachyoides], pait grass [Axonopus compressus], a'awian [Panicum montanum], gewor [Comellina nudiflora], badotan [Ageratum conyzoides], bayondah [Isachne globosa], and lameta [Leersia hexandra]. Forage from vines and leaves, including mikania [Mikania micrantha], kale [Ipomoea aquatic], cassava leaves [Manihot esculenta], calliandra [Calliandra calothyrsus], corn leaves [Zea mays], jackfruit leaves [Artocarpus heterophyllus], teak leaves [Tectona grandis], lamtoro leaves [Leucaena leucocephala], turi leaves [Sesbania grandiflora], banyan leaves [Ficus benjamina], Acacia leucoploea leaves, mangkokan leaves [Polyscias scutellaria], nampong leaves [Siegesbeckia orientalis], and gamal leaves [Gliricidia sepium].

Types of additional feed include bran, peanut shells [Arachis hypogaea], coconut cake [Cocos nucifera], banana peels [Musa paradisiaca], sweet potatoes [Ipomoea batatas], corn [Zea mays] and its skin, carrots [Daucus carota], pellets cattle. Apart from that, organic vitamins, medicines, and organic fertilizers were also given. The procurement of these materials is used to stimulate the growth and reproduction of deer [Takandjandji & Garsetiasih, 2002].

Feed is given 2 or 3 times a day, especially in the morning and evening, with an average percentage of fresh feed requirements based on the deer's body weight [BW] of 28.70% - 18.75% [age less than 12 months], respectively. then it decreased to 19.60% - 13.91% [age 12 - 24 months] and 12.32% - 10.93% [age 24 - 36 months]. The most feeding time is in the afternoon [Setio et al., 2010].

4. Place to eat

The feeding troughs that are commonly used are in the form of a trough measuring 1.5 – 2.0 m long and 0.5 m wide or in a hexagonal round shape measuring 50 – 75 cm in diameter and 30 cm high from the ground surface. The materials used consist of plain or smooth planks, wood, or zinc. The feeding place is placed in the middle or in the corner of the cage and every cage should have one feeding place.

5. Drinking place

Deer need water for drinking, and wallowing so it should be kept clean and changed frequently. During mating season, male deer really like water as a place to wallow. The drinking place used is in the form of a pond equipped with a disposal to avoid male deer which often gore, especially when entering the mating season. The location of the drinking bowls is in the middle or at the corners of the cage and every cage tries to have one drinking place [Takandjandji & Sutrisno, 2006 & Takandjandji, 2009].

6. Control walk

Control roads function for control and feeding with a road width of 1.5 – 2.0 m and should be located along the edge of the cage or fence.

7. Drains

Water is needed to irrigate food, maintain cages and deer. The farm should have a holding tank and water tower complete with generator. Drains need to be cleaned every day so they don't stagnate and cause an unpleasant odor, and they should be made slightly inclined towards the disposal site [Takandjandji, 2009].

8. Warehouse and equipment

This building functions to store captivity equipment and supplies, feed maintenance [agricultural tools], feed, and medicine.

In addition, facilities and infrastructure are also needed to support captive breeding in the form of harmonica screens, portable screens, clip cages, water installations [wells, water towers, water tanks, pipelines], electrical installations [PLN 3,500 VA electricity installation, poles and cables, lamps lighting, meter substation], and guard post [Takandjandji, 2009].

Captivity Technique

Deer captive consists of deer grouping, weaning, health, and ear tagging.

1. Deer grouping

The captive Timor deer are grouped based on physiological status, namely males and females who are ready to mate, males not ready to mate [just weaned], females not ready to mate [newly weaned], females that are pregnant, females giving birth and unhealthy deer.

This grouping is useful for facilitating feeding as needed, facilitating mating arrangements, keeping the males from disturbing other deer, security for pregnant deer in the birth process, calm for nursing deer in caring for their children, avoiding premature marriages, getting the opportunity feeding for newly weaned deer, and facilitating handling of sick deer [Takandjandji, 1994].

2. Deer weaning

Weaning is the doe unites with fawns until gain 4 months old, so that fawns gets enough milk. Weaning before the age of 4 months, for example the doe is being dead, requires addition milk using pacifier and or spoon [Takandjandji, 1994].

3. Health

Deer health needs to be considered so that productivity increase. Deaths in captive deer occur more frequently during the rainy season and the disease which often attacks are pneumonia [pneumonia] due to muddy and damp cages [Takandjandji & Sutrisno, 2006]. Mortality in adult deer is more caused by feed, environment, and stress due to handling. Efforts to prevent and eradicate disease in Timor deer are carried out in several ways, including sanitation of the enclosure environment, feeding that meets nutritional standards, improving handling techniques and vaccinations, as well as administering drugs according to the type of disease and medical recommendations.

4. Tagging

Tagging of deer is important in captive management. Marking should be done before the fawn is weaned and the purpose is to find out the pedigree, age, make it easier to control, make it easier to recognize individuals, and to facilitate mating arrangements [Takandjandji & Sutrisno, 2006].

The method of numbering Timor deer in captivity at the Kupang Forestry Research Institute in East Nusa Tenggara is the number is written on a thick piece of plastic or a board using nails or wire so that it is not easily lost, then the plastic is cut, and hung on the neck of the deer using a rope with a diameter 5 mm is then inserted into a 2 dim hose [Takandjandji, 1994]. Writing numbers uses 4 – 5 digits. The first number indicates the year of birth; the second and third numbers are the month of birth; the fourth digit indicates the master number [final number]; and the fifth number is the child's serial number. Example number 3223, i.e. 3 indicates a fawns born in 2003; 2 indicates the month of February; 2 indicates the parent that gave birth has a number ending in 2; and 3 means the mother has given birth 3 times [Figure 1].



FIGURE 1: Example of deer numbering in NTT [Takandjandji, 1994].

The way to number deer in captivity at HP Dramaga, Bogor is use numbers that are widely sold in the market [poultry shops] with numbers that are readily available and of relatively better quality. Managers adjust the available numbers to the existing genealogy [date of birth, code and ancestry] [Setio et al., 2018]. The number is attached to the right ear for buck and the left ear for doe, with the help of a tagger [Figure 2].



FIGURE 2: Tagging numbers, taggers, and other materials.

Fence and Pens Maintenance

Maintenance of fences and cages is carried out regularly so the deer do not leave the cage due to damage to the fence. Damage to fences occurs more often during the mating season because at that time, the jaws are itchy so the wire is one of the targets for goring. The environment and sanitation in the cage must be maintained so it is not damp, especially during the rainy season. Cage maintenance is carried out by cleaning it every morning before feeding so that the deer can consume feed in clean conditions and their health is guaranteed. Searching for and collecting feed is taken from the feed gardens which is managed and also comes from the pastures around the captive location. The allocation of labor used for cage maintenance, searching, collecting and providing feed, processing the feed garden, processing breeding waste and the surrounding environment as well as securing the deer is carried out 24 hours a day alternately [Takandjandji & Garsetiasih, 2002; Takandjandji & Sutrisno, 2006].

Feed Management

Feed management is conducted in order to obtain good and continuously available feed throughout the season, by means of cleaning, tillage, fertilizing, drying and watering. Cleaning of weeds and pendangiran is carried out once every three months while tillage and fertilization are once a year [Takandjandji, 1994].

Feeding Techniques

Giving fresh feed to Timor deer is based on the calculation of $10\% \times \text{body weight} \times 2$. The intention is multiplied by two, which is calculated by the amount of forage that is not eaten because it is old, disliked, dirty from being trampled, and has been mixed with urine and faeces [Takandjandji & Sutrisno, 2006; Takandjandji, 2009]. Feeding is always accompanied by salt as an appetite stimulant and to meet mineral needs. Feeding is done by irrigating where the forage is cut 3-5 cm and then given to the deer in the cage, both in the rainy season and the dry season. The frequency of feeding is 2 or 3 times a day [morning, afternoon and evening] while additional feeding in the form of rice bran is given three times a week, as much as 0.5 kg/individual.

Giving food to pregnant deer must be more intensive both in quality and quantity because the role of food is very important for the growth of the foetus in the womb and is also useful for maintaining the condition of the doe's body.

While feeding the fawn, starting at the age of two weeks by giving young forage [shoots] which are cut into small pieces. Apart from that, organic vitamins, medicines, and organic fertilizers were also given to encourage the growth and reproduction of deer, as well as to reduce the smell of manure.

CONCLUSION

Timor deer [*Rusa timorensis*] are easy to be captive because their adaptability to environments outside their habitat is quite high and Timor deer captive using a cage or confined system when they are in small or small numbers.

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