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A veterinary nurse's perspective: working alongside Sulawesi black crested macaques in Tasikoki Wildlife Rescue, Indonesia

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ABSTRACT: The following article describes the black crested macaque, an endemic species in Sulawesi, Indonesia. It looks at the current issues that the species faces and why their numbers are endangered. Tasikoki Wildlife Centre is a rescue and rehabilitation facility in Sulawesi working with the government to protect these macaques and help fight for their future protection.

Keywords: Veterinary; wildlife; black crested macaques; endangered; conservation

Tasikoki Wildlife Rescue is situated in the North of Sulawesi, an island in Indonesia. The centre is managed by the Masarang Foundation with the aim to care for and if possible, rehabilitate wildlife. The rescue centre currently cares for a variety of species some of which include: black crested macaques, sun bears, river turtles, babirusa, slow lorises, gibbons, crocodiles, pythons, red and blue lorikeets and cockatoos. The centre houses a large number of Black Crested Macaques (BCMs) which are endemic to Sulawesi. This article covers some of Tasikoki's work specifically looking at their involvement with BCMs.

As a veterinary nurse, the day to day roles at Tasikoki varied. The staff at Tasikoki begin work at 6am and the work can be tiring, especially during the hot and humid weather. Some of the roles included: assisting the veterinary surgeon with routine checks on recently seized BCMs, administering medicine under the guidance of the veterinary surgeon, monitoring anaesthetics, making and preparing blow dart syringes, following specific nutritional guidelines whilst preparing food for slow loris, cleaning and preparing enclosures, creating enrichment for rescued animals to help encourage natural behaviour,

foraging in the surrounding environment and utilising natural foliage to prepare meals for BCMs.

BCMs are only found in the north of the island Sulawesi. The species is critically endangered mainly due to habitat disruption, the illegal pet wildlife trade and hunting (Bowkett et al., 2013). There is only one viable population in Sulawesi, situated in the Tangkoko nature reserve (Agil et al., 2012). The worrying threat to the BCMs highlights the need and importance for rescue centres like Tasikoki. One of the main threats to their existence is hunting. The species is considered a delicacy and eating monkey meat is considered a traditional ceremonial food (Hilser, 2012). Tasikoki is helping to raise awareness by running open days for school children at their education centre. Their aim is to educate the younger population about the damaging effects that hunting has, making them think about their lifestyle choices. The children are given video presentations about the legal protection of wildlife and the importance of waste management and pollution control. They are able to take part in games and discussions helping to increase their awareness and importance of wildlife conservation.

At Tasikoki, there is a small veterinary clinic on site where general health examinations are performed, samples are obtained for analysis and operations take place. Currently, one veterinary surgeon is responsible for the health and rehabilitation of the wildlife at Tasikoki. The clinic is well maintained but certain drugs and equipment are in short supply due to restricted availability in Indonesia. The staff members explained that around 50% of their stock comes from donations alone (Figure 1).

Rescued BCMs are brought to the Tasikoki clinic and receive a full health examination by the veterinary surgeon under sedation (Figure 2). Zoletil was the sedative drug of choice given at a rate of 0.5 mg/kg for healthy individuals or 0.3 mg/kg for sick and old BCMs. It has been suggested that Zoletil® is a safe non-reversible anaesthetic agent useful for its fast induction (Almagro et al., 2018). The sedative effect on one macaque named “Juan,” was very rapid and effects began to take place two minutes after the intramuscular injection was administered. “Juan” was anaesthetised in order to clean and suture a wound he had received during a fight with another macaque. Another check on “Bandung” involved the use of Zoletil®. The sedation was very quick to take effect and achieved a good depth of anaesthesia for 15 minutes. There were not any complications with either sedations and all parameters measured were within the normal ranges. Measured parameters included: heart rate,

respiratory rate, mucous membrane colour, capillary refill time and temperature. The readings were then recorded on an anaesthetic chart for reference purposes. The body condition score was also assessed, along with gender, age, dental status and full body measurements helping to highlight any potential nutritional deficiencies. Blood may be collected if certain diseases are suspected or the condition of the BCM is particularly worrying. Unfortunately, the blood samples cannot be run at Tasikoki as the clinic does not have in-house blood machines so the samples have to be sent away to an external laboratory. Routinely, intravenous catheters are not placed in sedated patients unless the health of the BCM is fragile and the risk of mortality is high. Ideally the veterinary surgeon would like to place intravenous catheters in every sedated patient but due to the limited availability in Indonesia, this is not always possible. PRO-VAC™ RABIES-Fc vaccination, a killed form of the rabies virus and EQUIVAC® T VACCINE, a tetanus vaccine is administered to each macaque under sedation to immunise against potential disease. The gold standard protocol examination should also include full body radiographs of each BCM (Almagro et al., 2018), but the clinic has yet to purchase an x-ray machine. Providing that the health of the BCMs is acceptable, they are then transferred to isolation where they remain for three months. This is the minimum recommended time for a wild animal to remain in isolation to establish the health

status of each animal (Almagro et al., 2018) (Figure 2).

There are a number of concerns when humans work alongside macaques. It is possible that the transmission of certain diseases like Tuberculosis and Measles can occur so appropriate personal protective equipment should be worn at all times (Bayne, 2005). Herpesvirus simiae (Herpes-B Virus) can be transmitted to humans by direct contact with an infected macaque's tissue or bodily fluids. This is particularly concerning as records suggest that 70% of cases diagnosed in humans have been fatal (Conly & Johnston, 2008). One reported case of Herpes-B virus involved a laboratory worker who was accidentally bitten by a macaque. He recovered from the initial bite but fell ill immediately afterwards showing symptoms of worsening myelitis. He died just two weeks after the virus targeted his central nervous system (Hilliard, 2007). Staff at Tasikoki ensured that facial masks were worn at all times when working alongside the macaques along with suitable footwear which could be easily cleaned and disinfected. Clean scrub tops and theatre shoes were worn during any medical examination as a safety precaution and for good hygiene.

A macaque was separated from its group after being injured in a fight. Macaques are very social species and for them to develop normally, interaction with other members of the same species is very important for



Figure 1. The vet at Tasikoki clinic receiving donated gifts from Millpledge and Trovan.



Figure 2. A black crested macaque being restrained prior to its sedation.

them (Coleman, 2012). Due to the importance of social interaction, the macaque was isolated in a separate enclosure, parallel to its group. This allowed the individual to recover safely but still allowed visual and oral communication between the isolated macaque and the group. This helped to reduce any stress related separation and enabled appropriate interaction and exhibition of natural behaviour. The macaque required daily analgesia and antibiotics following surgery. Amoxicillin tablets were administered at a dose rate of 22 mg/kg and Metacam® oral suspension (Meloxicam) at 0.1 mg/kg. The tablets were crushed into a fine powder and the syrup was mixed with peanut butter, honey and banana in order to disguise the appearance and taste. The contents were then placed inside a leaf and the parcel was then offered to the recovering macaque as a treat helping to reduce any stress-associated administration (Figure 3).

The veterinary surgeon explained that not all of the macaques were suitable for rehabilitation and eventual release back to their natural habitats. Some of the primates which had been kept as pets had bonded

with their owners and suffered separation anxiety and depression once transferred to Tasikoki. As a result of these disturbances some of the macaques exhibited abnormal behaviours including circling, pacing, rocking and overgrooming. It has been suggested that these types of behaviour are quite often associated with inappropriate housing and an inadequate environment (Bayne, 2005). This supports the idea that people keeping macaques as 'pets' is in fact quite damaging for their mental and physical health. In order to provide the BCMs with human interaction, keepers at Tasikoki work closely alongside the macaques talking to them and working near their enclosures. One particular BCM's body condition score was assessed by the veterinary surgeon under sedation. It was measured as 2.5/5 indicating that the BCM was underweight. Its owner had been feeding it a diet consisting mainly of rice which is not the correct, balanced diet for this species. Plant fibre is beneficial for laxation, fats are consumed for vital energy production and seeds contain protein needed for growth and repair (Kassim et al., 2017). The diet of wild macaques varies but consists mostly



Figure 3. Administering disguised medicine to a black crested macaque.



Figure 4. Leaf bundles and enrichment for the macaques using natural materials.

of different fruits, leaves, flowers, seeds, barks, buds, lichens, invertebrates, small vertebrates and eggs (Roos & Zinner, 2017). If a macaque does not receive enough fats and protein from a varied diet then it can be assumed the individual may suffer from inadequate growth, reduced healing capabilities and lethargy (Kassim et al., 2017).

In order to improve animal welfare, captive macaques require stimulation. Black crested macaques are both intelligent and curious primates and in order to satisfy their desire to explore and investigate, it is important to give them the opportunity to forage for their own food (Bayne, 2005). The staff at Tasikoki ensured that the macaques had plenty of nutritional enrichment, often using innovative and inventive ideas of their own to help keep them occupied. Hard boiled eggs with cracked shells were occasionally given to the macaques as treats. In this way they were encouraged to peel off the shell layering in order to be able to eat the egg. “Bundles” consisting of nearby rainforest foliage wrapped tightly into parcels were handed out in the morning to the macaques. They were positioned on top of the enclosures and inserted through the bars. Positioning the food on top of the enclosures helped to stimulate the macaques to climb and work for their food. It has been suggested using a recent study that familiarity did not seem to affect the engagement of the animal’s response to a type of foraging enrichment as the macaques did not seem less interested in the activity after the novelty had worn off (Bennett et al., 2014). The foliage bundles at Tasikoki were handed to each macaque every morning at a similar time. All of them

showed interest immediately in the bundles offered to them, snatching the foliage and pulling apart the vines. The behaviour observed at Tasikoki helps to support the theory that enrichment can be repeated and still achieve desirable stimulation (Figure 4).

Tasikoki Wildlife Rescue has been successful with its rehabilitation programme, enabling some suitable BCMs to return to the wild. An animal behaviouralist working at Tasikoki explained that the animals are studied intensively prior to any attempt at rehabilitation and release. This gives them the best chance at survival in their natural environment ensuring that their behaviour is appropriate before their release. Tasikoki is not currently involved in breeding BCMs due to the overwhelming number of macaques which are rescued and brought to the centre. The rescue centre is already at full capacity and currently would not be able to support a breeding programme.

Tasikoki Wildlife Rescue is working at educating the younger generation, helping to put a stop to hunting and the illegal pet wildlife trade. In order to improve the clinic further, highly desirable assets include: in-house blood machines both biochemistry and haematology machines, x-ray machine, oxygen canisters, gaseous anaesthesia with an appropriate anaesthetic machine and controlled injectable drugs such as ketamine. Companies including: Millpledge, Trovan Microchips, Vetoquinol, Boehringer, Ceva, Pet ID Microchips, Avid microchips and Pioneer have kindly donated a range of items including: swabs, bandage materials, microchips, medication, surgical drapes,

tissue glue, giving sets, urinary and intravenous catheters to help benefit the centre. The rescue centre works hard to make a difference, contributing to wildlife conservation on a daily basis. However, there are so many wildlife casualties in need of help that it is a constant struggle to meet the demand with such limited resources. Volunteers travelling to the clinic in Sulawesi including veterinary nurses and surgeons can give up their time and knowledge and work alongside Tasikoki staff. These much-needed volunteers are a vital part of the Tasikoki community, not only directly getting involved but spreading the word of Indonesia’s wildlife crisis.

Disclosure statement

No potential conflict of interest was reported by the author.

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