

AUTOMATIC CAMERA SURVEY FOR MONITORING REPRODUCTIVE PATTERN AND BEHAVIOR OF JAVAN RHINOCEROS (*Rhinoceros sondaicus*) IN UJUNG KULON NATIONAL PARK, INDONESIA

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Introduction

Javan rhinoceros (*Rhinoceros sondaicus*) is the most endangered species of the five rhino species worldwide. With only around 50 animals in Ujung Kulon National Park (and additional 7 in Vietnam's Cat Tien National Park) and none in captivity, these rhinos are very difficult to spot; thus creating difficulties for thorough study on this species. IUCN has classified the javan rhinos as critically endangered due to this fact. Griffith (1993) has initiated the use of automatic camera survey (camera trap) to photograph individual rhino with only minimum human presence in the rhino habitat. These photos allow positive identification of each rhino for more accurate observation and population estimate. This method was replicated by Yahya (2002) where, after identification, each rhino was registered in a database. The use of camera traps is continued to monitor other aspects of javan rhino's biology such as reproductive pattern and behavior.

Materials and Methods

Sixteen automatic cameras equipped with heat and motion sensor (Camera Trap) manufactured by DeerCam were used in the survey between years 2004-2008. In addition to the camera trap units, two automatic video cameras (Video trap) were used to study the behavior of the rhinos. The video trap units were assembled courtesy of WWF Malaysia. Camera trap units were placed in sixteen observation blocks (an area approximately 2.5 x 2.5 km²) within Ujung Kulon peninsula with known rhino presence from previous camera trap survey and/or footprint identification. In addition to camera trap photos, the teams also recorded signs of rhino presence (footprints, feeding, wallowing, sounds) not captured with the cameras. Video trap units were placed in wallowing and also trails female rhino and the calf often use to observe the behavior. All

camera and video trap units were installed every month, and the field teams collected the films for analysis while replacing the films and battery for each unit in the following month.

Results and Discussions

Camera trap equipments manage to obtain photograph of rhino mother and calf every year starting from 2004 to 2007. Additional data record from the field team also shows newborn rhinos' footprint size 16-17 cm to 20-21 cm along with mothers' footprints). They found three newborns in 2004 and four in 2006. Two video trap units placed in 2008 recorded behavior of one mother-calf pair in trail and in wallowing as well as one adult male in wallowing. The presence of mother-calf pair every year within the survey period suggests the following:

1. Long period of mother-calf affiliation after birth
2. Rhino calf being born almost every year

To further analyze the two possibilities, geographic factors and individual identification are taken into consideration to determine whether the individuals in the data are different ones. There is a strong possibility that one of mother-calf pairs in 2004 is the same as the one detected in 2005, while the ones in 2006 and 2007 are different. Footprint analysis also confirms this possibility by differentiating individuals. Video trap data is still insufficient to make estimation of behavior patterns of mother-calf pair: however, there are signs that the mother is very aware with heightened senses (smell and hearing) to ensure safety of her young. There are also signs of this mother-calf pair in the process of separation judging from occasional distance between the mother and the calf.

Conclusions

Analysis from photos of mother-calf pair over four year-period (2004-2008) shows that the affiliation of mother and calf after birth may take as long as two years (based on data from pairs in 2004-2005). There is a trend of rhino newborn every third years in 2004 and 2006 where 3 and 4 rhino calves were born respectively giving an estimation of 7 births in 3 years (approximately 2 births each year). There are indications in behavior of mother-calf pair where the mother is highly alert and aggressive with heightened senses of smell and hearing. Camera and video traps can be further improved to monitor biomedical aspects of the javan rhino such as injuries, abnormalities, and other external features in addition to fecal analysis done by Tiuria

(2006). The results from camera trap and video trap surveys show that the population in Ujung Kulon is still reproducing.

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