

## SHORT COMMUNICATION

# Cuscus (*Phalangeridae*) Hunting by Biak Ethnic Group in Surrounding North Biak Strict Nature Reserve, Papua

FREDDY PATTISELANNO\*, JOHAN FREDRIK KOIBUR

*Sublaboratory Livestock and Wildlife Breeding, Animal Production Department, Faculty of Animal Science, Fishery and Marine Sciences (FPPK), Papua State University, Manokwari 98314, Indonesia*

Received January 17, 2008/Accepted August 12, 2008

Study on cuscus hunting as a form of wildlife utilization by Biak ethnic group surrounding the North Biak Strict Nature Reserve (CABU) was carried out through direct observation and interview with hunter respondents and other key respondents among four villages that purposively chosen i.e. Inswambesi, Kayomi, Wasani, dan Sansundi at the Warsa District of Biak Numfor, Papua. Two species of cuscus occurs in the study site were common cuscus (*Phalanger orientalis*) and spotted cuscus (*Spiloglossus maculatus*) and they were observed as hunting target in CABU. Hunting was performed partly as routine activity used various traditional tools (slash blade, trap, spear, and calling cuscus) and modern weapon (firearm). Cuscus hunting was done to supply animal protein for households, inspite some hunting results raised for consumption and market purposes. For one period of hunting 3-4 cuscus were caught and it was lower than five years ago. It was indicated that the population condition was vulnerable on overharvest and at the present time cuscus population tend to decreased. Traditional wisdom of Biak ethnic group should be explored and practiced again as the form of local law in order to manage cuscus hunting for the future cuscus conservation program.

Key words: cuscus, hunting, biak ethnic group

## INTRODUCTION

Hunting and wildlife extraction from the nature are always practiced because they are considered as the important aspect and can not be separated with the social environment. Even in the modern era some ethnic groups in Papua are rely on hunting as a part of community tradition or hunting is considered as a community way of life (Kwapena 1984; Pattiselanno 2003; Iyai & Pattiselanno 2006; Pattiselanno 2006). According to Lee (2000), hunting can be broadly divided into (i) active hunting, requires the hunter actively pursue the animal, labor intensive and time consuming and (ii) passive techniques that firstly requires intensive effort like building a trap and setting a snare. Hunting in Papua is conducted in both active and passive (Pattiselanno 2006), and performed around the forest and conservation area.

Setiawan and Alikodra (2001) explained that in terms of number and wide, in the last decade (1970-1999) the conservation area tended to increase and diverse, reached a number of 385 unit, which 29 (37.63%) of them were located in Papua. Based on Forestry Plannology Agency in Forestry Department, until 2003 the areas of Nature Reserve in Papua were 8,156,000 ha or about 42% of the total areas in Indonesia in terms of land coverage within and around forest site.

Cuscus is pouch marsupial classified under Phalangeridae family, one of several species considered as hunting target in Papua (Flannery 1994; Menzies 1994; Petocz 1994). Forest

conversion and illegal hunting are the most common threats that effect cuscus population and currently, and according to the IUCN criterion cuscus belongs to the group of animal with least concern and not included as extinction species (Bailey & Groombridge 1996).

Wildlife hunting in tropical forest is different from any subtropic areas because it is mostly performed for subsistence and commercial purposes (Redford & Robinson 1987). This situation is therefore indicating that subsistence hunting tend to become a common phenomenon occurs in almost tropical forest areas (Vickers 1984; Redford 1992) and it attracts ecological and anthropological scientist to conduct particular study in order to explore hunting of wild animals in tropical areas in the world (Peres 2000).

## MATERIALS AND METHODS

**Time and Place.** Information on cuscus hunting as partly of subsistence hunting was conducted from October to November 2006 in North Biak Strict Nature Reserve (CABU) to learn about cuscus hunting behavior as a form of their utilization by Biak ethnic group around CABU. Four villages around and adjacent to the study site were selected purposively to collect information on cuscus hunting: Inswambesi, Kuyomi, Wasani, and Sansundi in Warsa District of Biak Regency, Papua Province. Those villages were selected because they were accessible and directly border to the study site. Descriptive method with interview technique and direct observation were applied in collecting data in the field.

\*Corresponding author. Phone: +62-986-212156,  
Fax: +62-986-211455, E-mail: fpattiselanno@yahoo.com

**Methodology.** Direct observation and structural interview by using questionnaire were conducted to 40 common respondents who utilized and conducted cuscus hunting in four villages as follows: Inswambesi (9 respondents), Kuyomi (12 respondents), Wasani (10 respondents), and Sansundi (9 respondents) in Warsa Districts. Respondents were purposively chosen from 10% of total inhabitants in each village who actively performed cuscus hunting. To clarify information received from the respondents, nine additional key respondents (community leader, tribe man, and cultural leader) were censused and interviewed for gathering relevant information on cuscus species, cuscus hunting (hunting behaviour includes purpose of hunting, weapons) and cuscus conservation includes community opinion on hunting activity and traditional wisdom among local people.

**Description of the Study Site.** The area of Biak Utara Strict Nature Reserve (CABU) is located in 125°40'03" – 125°54'04" E and 00°23'05" - 00°29'10" S was assigned as protected area in Papua based on Agriculture Ministry Decree No. 731/Kpts-II/1996, and covered approximately 11,000 ha areas at 0-695 m above sea level. Generally, topography in CABU was surge to steep, 60% of the area was mountainous old rockies with alluvial or similar to red-yellow mediteran soil.

CABU is one of conservation areas in Papua represents lowland primary forest site that has 82 species birds and 26 species mammals (Petocz 1994). Human-forest interaction in CABU currently is expressed through hunting activities includes cuscus hunting that still put into practice (Jandewoa 2004; Dahruddin *et al.* 2005).

## RESULTS

**Cuscus Species.** During field observation, based on morphology description by Flannery (1994) and Menzies (1994) two species of cuscus have been identified in the field namely common brown cuscus/eastern cuscus (*Phalanger orientalis*) and common spotted cuscus (*Spilogiscus maculatus*).

Hunters in the study site were easily distinguished both cuscus species by observing specific characters of their hunting target. The species *P. orientalis* has unique characteristic usually noted by local community i.e. dark strip along the dorsal running from the head to the distal part (tail) which is unfurred. In fact, hair around the body of cuscus is various, but in the study site the cuscus has dark brown in hair. Another characteristic is hair colour above the body particularly in abdomen was white and yellowish. Local dialect in Biak called “*irwaref*” for male cuscus while female was called “*inaben*”.

The species *S. maculatus* or “*maknam ob-ob*” in local dialect had characteristic that commonly used by local community in identifying their difference from the other species, because they have larger body weight than others and have various color of hair spot. Their hair is more likely wool with extremely variable in color that are yellow, light brown, and grey brownies.

**Cuscus Hunting.** Hunting is the activity that routinely performed from their predecessor in the past and it is put into

practice until presently by the native Papuans include Biak ethnic group who inhabit the area around CABU. Various weapons (bladé, trap, snare, and modern gun such as air rifle) were usually used in performing hunting, and one interesting thing to be noted is the way of hunter immitating cuscus voice and it seems that hunters call the animals to come closer and kill that animal easily using blade or wood stick. The most common gun used in hunting is low caliber gun that easily found and sold in local market, because licence or permit to own the gun is not required. In local dialect, that kind of gun usually called “*cis*” with pellet bullet like pebble.

Biak ethnic group classified as traditional hunters because only 6 percent of respondent were using modern guns (usually not the standard sport gun) while others were using traditional tools. Another indicator is the purpose of hunting that commonly for consumption and this was also acknowledged as indicators of subsistence hunting that purely for animal protein supplying on households, different from sport hunting that offers nature recreation in adventure based.

In performing cuscus hunting in CABU, hunters usually trace the location that commonly utilize as nestcover or place for food searching of cuscus. Our observation showed that common vegetation around the study site that commonly used as nesting tree are *Cocos nucifera*, *Barringtonia asiatica*, *Ficus microcarpa*, *Pometia pinnata*, *Sterculia longifolia*, and *Payena lucida*, while those that utilized as food sources are *Dracontomelon dao*, *Canarium indicum*, *Calophyllum inophyllum*, *Ficus virens*, and *Piper aduncum*. Around CABU, cuscus hunting was commonly perform to fulfil household’s animal protein consumption, even in fact catch results in good condition are kept and raised for further sold or consumed. Sometimes, hunting results sold for additional households income for Biak hunters was also found, eventhough it was not primary reason of hunting. Cuscus was sold with orice of Rp30.000 to Rp50.000. The price was various rely on body size of the sold cuscus.

**Cuscus Conservation.** Hunting results were various between 3-4 cuscus in each hunting period. Age structure and sex were various because it is difficult to identify the animal’s age and sex of hunting target from long distance. Sometimes, pregnant female with juvenile in her pouch were killed during hunting. Individual hunting was performed by 17 respondents while other respondents performed hunting in group with average of member about 3-4 persons. In weekly period of activities hunting was mostly performed twice because major activity of respondents was farmer and fishermen (87.5%). Hunting activities usually performed in spare time during post harvesting season of the agriculture products or during high tide season when they were not fishing. Compared to the past five years, catch results of cuscus hunting are lower, and it is indicates that currently the population of cuscus tend to decrease. This study provides preliminary information that urge for further study on cuscus in their natural habitat, number of hunters involve in cuscus hunting, impact of hunting on cuscus population and the effect of cuscus meat demand on the population number. In spite of previous assumption, further analysis needs to be tested through supplementary study on cuscus population in CABU.

The importance of wildlife resource in the tropical forest compels competent government agencies to control the level of wild animal harvest in order to sustain the population number in the forest. Government Regulation No 13 about the regulation on wildlife hunting was not optimized in particular case in CABU. For example, law in line with license, hunting act and quote were not recognized by local hunter in the study site. One thing that should be noticed related to hunting activities was showed by Chapter I Article 2 on this law clearly enforce hunting activities should be based on sustainable use emphasis on population number, carrying capacity, and ecosystem balance. The real situation in the field pictured that some aspects have not well implemented in cuscus hunting in CABU.

In concerned with the role of wildlife resources in the tropical forest and its contribution to local communities around the forest, it is suggested that level of wildlife harvest and cuscus in particular should be well considered. Cuscus protection was clearly regulated by law therefore wildlife hunting was strictly banned for other reasons. However, in fact almost all respondents (80%) or 32 respondents were not understand about the regulation and it is assumed that socialization of this kind of law inforcement did not reach the bottom level of community. On the other hand, traditional wisdom aspects related to wildlife conservation have no longer put into practice. It is clearly showed by several facts that found during the study. In this case, the use of hunting gear that shifted from traditional to the modern guns, particular important places that considered to be sacral were lost because they were converted into other purposes and unlimited access to hunting areas because some remote areas are recently altered for several purposes. The most important example is including the development of Papua Province into new province and regencies that reduced previous places that considered being sacral.

## DISCUSSION

Cuscus species found in the study site is similarly related to the previous study conducted in relatively comparable location by Dahrudin *et al.* (2005) who identified the presence of two cuscus species in the area namely *P. orientalis* Pallas dan *S. maculatus* Desmarest. If referred to particular study previously conducted in the New Guinea Island, the distribution of *P. orientalis* in Irian Jaya (Papua) was in Japen Island, Biak-Supiori, and di around Cenderawasih Bay, and further explanation showed that *P. orientalis* has wider distribution area in most of Papua lowland rainforest from the coastal up to the highland at the altitude of 1,500 m above sea level (Flannery 1994; Petocz 1994).

Flannery (1994) explained that *S. maculatus* was introduced to Papua, eventhough currently their origin was still debateable (Australia or New Guinea Island). It is believed that the migration was occurred during the New Guinea and Australia were both connected in the same land so that the distribution of this species through Torres Bay to the western part of Sulawesi and the Salomon Island in the eastern was taken place and they are currently disperse fairly in almost

part of the Papua Island. According to Petocz (1994) *S. maculatus* do not have dorsal stripe and most of their ear part covered by hair. Sometimes spotted hair characteristic is not found. As cited by Flannery (1994) and Singadan (1996) color around the body of cuscus is various such as white, yellow, grey, and brown hair.

Wild animals hunting is recognized as tool for animal harvesting from the forest, and it was classified as subsistence hunting that use traditional gun (Redford & Robinson 1987) and modern hunting or sport hunting by using firearm (Robinson & Redford 1994; Robinson & Bodmer 1999). This condition is relatively similar to cuscus hunting by Napan communities in the Ratewi Island, Nabire, Papua that used various kinds of weapons both traditional and modern, however, slash blade “*parang*” and spear “*kalawai*” were mostly employed in performing cuscus hunting (Pattiselanno 2007). In West Timor, East Nusa Tenggara, cuscus hunting was performed by using “*fiti* or *stif*” (slingshot), blade or “*senjata tumbuk*” (Farida *et al.* 2001). According to Madhusudan and Karanth (2002) shift of hunting from using traditional equipment to modern is important to obtain more efficient catch results. Others indicated that hunting is a big business, therefore the involvement of hunter from other places are high and they regularly provide ammunition and gun to local hunter (Hart 1978; Robinson & Bodmer 1999).

Dahrudin *et al.* (2005) described cuscus habitat in North Biak Strict Nature Reserve as undisturbed primary forest with various kinds of canopy trees. Further explanation indicated 57 plant species were identified as food sources while 11 tree species used as nesting trees.

Wildlife hunting was performed for different purposes. At certain areas where access to animal protein sources from livestock is limited, utilization of wild animals for food is dominant. This phenomenon is normal and Martin (1983) explained it as a hunting target. Wild animals are animal protein sources that easily obtained in the remote areas and at the same time they provide meat requirements for local markets (Robinson & Bodmer 1999; Pattiselanno 2007). The study of Farida *et al.* (2001) also suggested that cuscus utilization for household diets was commonly practiced by local people in West Timor Barat, East Nusa Tenggara. This is in line with Pattiselanno (2004) who explained that wildlife utilization for consumption contributed significantly to supply animal protein for local households in the remote areas in Papua. Several reasons have been identified related to wildlife hunting in the tropical forests for example: to supply household nutrient (Bennet & Robinson 2000; Pattiselanno 2003), commercially for extra income to local people (Bodmer *et al.* 1997), social and cultural reasons (Ajayi 1974; Kwapena 1984; Madhusudan & Karanth 2002; Pattiselanno 2003) and combination from previous reasons (Bennet & Robinson 2000). In Africa, wild animal meat (bushmeat) commonly sold and considered as one of animal protein source for household (Fa & Yuste 2001). Generally, according to Prescott-Allen and Prescott-Allen (1982) at least people in 62 countries in the world who utilized wild animals to supply animal protein for families.

Several studies in different places showed that cuscus meat was preferred for household consumption. Sinery (2006) for example, emphasized that life cuscus was priced between Rp100.000 and Rp200.000 in Manokwari. A report of Farida *et al.* (2001) in East Nusa Tenggara showed that living cuscus or dead cuscus was sold Rp15.000 to Rp25.000 in the traditional market.

Based on previous studies, it was assumed that wildlife species in the tropical forest was vulnerable to over-exploitation. Some factors that have been identified as the cause were of the demand of wild animal meat (Mc Rae 1997; Robinson & Bodmer 1999), modern hunting technique adoption (Redford & Robinson 1987; Peres 2000) and increase in commercial value of wild meat (Fa *et al.* 1995). Several studies were also indicated that certain traditional wisdom was disappeared due to development of some remote regions (Ajayi 1974; Redford & Robinson 1987; Stearman & Redford 1995; Oates 1996; Madhusudan & Karanth 2002).

If wildlife harvested in the tropical forest need to be sustained, competent management institutions is also need to be strengthened. In Papua case, related institution that important to be bolstered are Forestry Institutions, Conservation of Natural Resources Bureau (BKSDA), Regional Management Environment Impact Board (BAPEDALDA) and other law based institutions, Police and Justice. Other social institutions such as NGOs, Culture, Religions, and informal structure in community level should be involved in order to increase each institution capacity. Collaboration among technique and social institutions were not established yet and approaches in the field sometimes were not connected with social, culture and local religion understanding that lead to unsynchronized between the program and local community conditions. Utilization of local cultural institutions in community level was not improved yet.

Efforts to improve government ability in understanding law products that strongly related to conservation program are urgent to be done so the natural resource conservation and management must be nationally prioritized. In several cases different opinion on conservation status of some wild animal species were common, because of overlapping between different regulations on certain animal species status. Punishment to illegal action in relation to break the law enforcement is important. It is also usual that uncontrolled hunting and protected wildlife ownership were legally found until now because particular regulation on protected wildlife was not ratified yet.

In Indonesia, as cited by Maryanto and Soebekti (2001) *P. orientalis* dan *S. maculatus* include in biota species that protected by the government regulation, decree of Agriculture Ministry No. 247/Kpts/Um/4/1979 Government Decree No. 7 of 1999. Law enforcement should be also implemented in order to increase people awareness particularly hunters knowledge about protected wildlife species included cuscus. It is therefore, Riley (2002) emphasized that conservation initiative is required to handle hunting pressure on cuscus population and fruit bats in Sangihe Talaud. Specific approach was offered

by Madhusudan and Karanth (2002) in related to wildlife hunting management that focused on the wildlife product consumer management partly as non-timber forest products (NTFPs) through traditional wisdom implementation within local communities. As indicated by Kwapena (1984) and Pattiselanno (2006) several aspects considered as traditional wisdom in connection with wildlife hunting in Papua such as, the use of traditional weapons, beliefs on sacral places where hunting were not allowed to be performed, restricted hunting on particular wild animal species respected as symbol, emblem or totem of certain tribes, and particular taboos based on religion, culture belief that control particular wildlife hunting. Approaches offered by Stearman (1994) that the involvement of religion institutions in the conservation program is vital because the religious is strong enough influencing people life. In this case the traditional wisdom among Biak ethnic group should be deeply explored and applied as the form of local regulation implementation in cuscus hunting to support conservation effort of cuscus in the future. Religion approach that has strong influence and relevance in most part of Papua is also important to be implemented because the role of religion leader gives significance impact on people daily life.

#### ACKNOWLEDGEMENT

Appreciate should go to Sonya Ap for her assistance in collecting some relevant information in the field and collaboration to construct the article. Similarly, we would like to thank anonymous reviewer for input and comments to improve this manuscript.

#### REFERENCES

- Ajayi SS. 1974. Giant rats for meat and some taboos. *Oryx* 12:379-380.
- Bailey J, Groombridge J. 1996. *IUCN Red List of Threatened Animals*. Switzerland: IUCN Gland.
- Bennet EL, Robinson JG. 2000. Hunting of wildlife in tropical forest: implications for biodiversity and forest peoples. Paper No. 76 on Biodiversity series – impact studies. Washington: World Bank and WCS.
- Bodmer RE, Eisenberg J, Redford KH. 1997. Hunting and the likelihood of extinction of Amazonian mammals. *Conserv Biol* 11:460-466.
- Dahrudin H, Farida WR, Rohman AE. 2005. Jenis-jenis tumbuhan sumber pakan dan tempat bersarang Kuskus (Famili Phalangeridae) di Cagar Alam Biak Utara. *Biodiversitas* 6:253-258.
- Fa JE, Juste J, Peres Del Val J, Castro-Vejeo J. 1995. Impact of market hunting on mammal species in Equatorial Guinea. *Conserv Biol* 9:1107-1115.
- Farida WR, Semiadi G, Wirdateti, Dahrudin H. 2001. Pemanfaatan Kuskus (*Phalanger* sp.) oleh masyarakat Timor Barat, Nusa Tenggara Timur. *Biota* 6:85-86.
- Flannery TF. 1994. *Mammals of New Guinea*. Australia: Reed Books.
- Jandewoa OR. 2004. Exploration of cuscus and its habitat in North Biak of Biak Numfor Regency [Skripsi]. Manokwari: Faculty of Forestry, Papua State Univ.
- Hart JA. 1978. From subsistence to market: a case study of the Mbuti net hunters. *Human Ecol* 6:325-353.
- Iyai DA, Pattiselanno F. 2006. Keragaman dan ekologi *Varanus indicus* di Pulau Pepaya taman nasional teluk cenderawasih Irian Jaya Barat. *Biodiversitas* 7:181-186.
- Kwapena N. 1984. Traditional conservation and utilization of wildlife in Papua New Guinea. *Environmentalist* 4:22-26 (suppl).

- Lee RJ. 2000. Impact of subsistence hunting in North Sulawesi, Indonesia and conservation options. In: Robinson JG, Bennett EL (eds). *Hunting for Sustainability in Tropical Forests*. New York: Columbia Univ Pr. p 455-472.
- Madhusudan MD, Karanth KU. 2002. Local hunting and conservation of large mammals in India. *Ambio* 31:49-54.
- Martin GHG. 1983. Bushmeat in Nigeria as a natural resource with environmental implications. *Environ Conserv* 10:125-132.
- Maryanto I, Soebekti K. 2001. Mamalia. In: Noerdjito M, Maryanto I (eds). *Jenis-Jenis Hayati yang Dilindungi Perundang-Undangan Indonesia*. Cibinong: Balitbang Zoologi (Museum Zoologicum Bogoriense) Puslitbang Biologi-LIPI dan The Natura Conservancy.
- McRae M. 1997. Road kill in Cameroon. *Natural History* 106:36-47.
- Menzies JJ. 1994. A handbook of New Guinea marsupials and monotremes. Papua New Guinea: Christen Pr Madang.
- Oates JF. 1996. Habitat alteration, hunting and the conservation of folivorous primates in African forests. *Aust J Zool* 21:1-9.
- Pattiselanno F. 2003. The wildlife value: example from West Papua, Indonesia. *Tiger Paper* 30:27-29.
- Pattiselanno F. 2004. Dukungan potensi biologi terhadap ekoturisme di Taman Nasional Laut Teluk Cenderawasih. *Media Konservasi* 9:99-102.
- Pattiselanno F. 2006. The wildlife hunting in Papua. *Biota* 11:59-61.
- Pattiselanno F. 2007. Cuscus (Phalangeridae) hunting by Napan communities at Ratewi Island, Nabire, Papua. *Biodiversitas* 8:274-278.
- Peres CA. 2000. Effects of subsistence hunting on vertebrate community structure in Amazonian forests. *Conserv Biol* 14:240-253.
- Petocz RG. 1994. *Mamalia darat Irian Jaya*. Jakarta: PT. Gramedia Pustaka Utama.
- Prescott-Allen R, Prescott-Allen C. 1982. *What's wildlife worth?* Washington: International Institute for Environment and Development.
- Redford KH. 1992. The empty forest. *Bioscience* 42:412-422.
- Redford KH, Robinson JG. 1987. The game of choice: patterns of Indian and colonist hunting in the Neotropics. *American Anthropologist* 89:412-422.
- Riley J. 2002. Mammals on the Sangihe Talaud Islands, Indonesia and the impact of hunting and habitat loss. *Oryx* 36:288-296.
- Robinson JG, Redford KH. 1994. Measuring the sustainability of hunting in tropical forest. *Oryx* 28:249-256.
- Robinson JG, Bodmer RE. 1999. Towards wildlife management in tropical forest. *J Wildl Man* 63:1-13.
- Setiawan A, Alikodra HS. 2001. Tinjauan terhadap pembangunan sistem konservasi di Indonesia. *Media Konservasi* 7:39-46.
- Sinery AS. 2006. Jenis kuskus di Taman Wisata Gunung Meja Kabupaten Manokwari. *Biodiversitas* 7:175-180.
- Singandan RK. 1996. Notes on hybrid Spotted Cuscus, *Spiloglossus maculatus* X *Spiloglossus kraemeri* (Marsupialia: Phalangeridae). *Science Guinea* 22:77-82.
- Stearman AM. 1994. Losing game. *Natural History* 1:6-10.
- Stearman AM, Redford KH. 1995. Game management and cultural survival: the Yuqui ethnodevelopment project in lowland Bolivia. *Oryx* 29:29-45.
- Vickers W. 1984. The faunal components of lowland South American hunting kills. *Interciencia* 9:366-376.