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STUDENT PANEL

CERTIFICATE OF ATTENDANCE

This is to certify that

Dr. RIZALDI

Attended the

"SEEKING THE NEW BALANCE"

Student Conference on Conservation Sciences (SCCS)-Beijing

Student Sub-Forum of the Beijing Forum

November 7-10, 2014

Peking University, Beijing, P.R.CHINA

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北京论坛 | 大会手册 HANDBOOK

2014

文明的和谐与共同繁荣
——中国与世界：传统、现实与未来

THE HARMONY OF CIVILIZATIONS AND PROSPERITY FOR ALL
China and the World:
Tradition, Reality and Future

2014年11月7日–9日　北京
November 7th – 9th, 2014　Beijing

北京论坛
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2014

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Seeking the New Balance — Student Conference on Conservation Science

November 7th, 2014 Afternoon
Venue: Room 101, Life Sciences Building, Peking University

Session 1

Time	Speaker	Topic
14:00-14:10	**Lu Zhi**	Introduction to SCCS-Beijing
14:10-14:30	**Wu Hong**	Opening Remarks
14:30-15:10	**Ma Keping**	[Plenary Speech] Biodiversity: Status and Conservation in China
15:10-15:25	**Xiang Xixi**	Changes in Aquatic Plants Response to Human Activities in the Plateau Lake Dianchi in China Using Current Data and Historical Records
15:25-15:40	**Piyal Karunarathne**	Assessing the Importance of Urban Landscapes for Biodiversity Conservation in Tropics: Case Study in Sri Lanka
15:40-15:55	**Rajat Nayak**	Effect of Changed Grazing Practices on the Ground Vegetation in the Western Himalayas
15:55-16:10	**Luis Emilio Escobar Quinonez**	Niche A: Using Virtual Reality to Model
16:10-16:30	**Coffee Break**	
16:30-16:45	**Dessalegn Ejigu Berhane**	Habitat Preference of the Endangered Ethiopian Walia Ibex (Capra Walie) in the Simien Mountains National Park, Ethiopia
16:45-17:00	**Rizaldi**	Threats to the Large Mammal Conservation: Lessons from Sumatra
17:00-17:15	**Warnakulasooriya Mudiyanselage Menaka Dilhari**	Consequences of Fragmentation on Territory Quality of Copsychus Malabaricus in Western Part of the Mihintale Sanctuary Sri Lanka
17:15-17:30	**Huang Yue**	Environmental Factors Affecting the Diversity of Bird Communities in Urban Parks of Beijing, China

Training Session 1

18:30-21:30	**Wang Hao**	Using MAXENT Software in Predicting Species Distribution

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THREATS TO THE LARGE MAMMAL CONSERVATION: LESSONS FROM SUMATRA

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Abstract

Sumatra is a home of many exotic wildlife mammals. Since last three decades, forest habitats in the island have extensively been converted due to rapid growth of large-scale plantations. In order to support conservation efforts, we studied distribution and threats to the large mammals in the middle landmass of Sumatra. The results showed that the distribution of Sumatran tiger and elephant is rapidly decreasing since last five decades, especially in Riau and Jambi when oil palm plantation rapidly expanded. We could estimate when the extinctions had occurred and put the information into species distribution maps. On the other hand, palm civet, Asian golden cat, and wild boar might expand their distribution. Wild boar and palm civet are distributed widely even in the cultivated fields. The agile gibbons living in fragmented forest were found at high density, small home range and each monogamous group maintains exclusive territory. Hunting wild boar might not bring a significant influence on their population size because the number of boars killed was very few. Those results indicated that deforestation, fragmentation and hunting threatened different species of mammal by different ways, therefore conservation strategies have to take species concern into account.

Introduction

Sumatra with a total land area of 473,607 km^2 is a home of many exotic wildlife mammals (Macdonald *et al.* 2007). Since last three decades, forest habitats in the island have extensively been converted due to rapid growth of large-scale plantations (Donald, 2004) and illegal logging (Jepson *et al.*, 2001). Many species of arboreal mammals suffered from local extinction and isolation in the fragmentary scattered small habitats. Conservation efforts and partnerships among stakeholders have to be strengthened in order to save the most endangered and remarkable large-mammals of Sumatra (Kinnaird

et al. 2003, Blake and Hedges, 2004). Conservation strategies required reliable information on what's going on the mammals, their habitats and human interferences. We studied the history of local extinction of Sumatran tiger and elephant- the most pronounce species, and connected to the anthropogenic impact that has eliminated them (Bakar *et al.* 2007, Rizaldi *et al.* 2008). We compared this study with a long story of traditional hunting on wild boar (Sus scrofa)- a very ubiquitous terrestrial species in West Sumatra (Rizaldi *et al.* 2007). A recently common threat of fragmented forest habitat has being studied to obtain scientific measures how that influences agile gibbons (Hylobates agilis)- a very vulnerable arboreal species in Sumatra. This paper aims to summarize those studies in order to: 1) understand the present distribution of large fauna in Sumatra including Sumatran tiger, elephant, primates, palm civet, Asian golden cat, and wild boar, 2) find out how vulnerable species adjusts ecologically to the limited resources and how such quality of the habitat supports their life, and 4) find out how ubiquitous species affected by traditional hunting. We hope to obtain lessons from those Sumatran's mammals to support designing appropriate conservation efforts.

Methods

The distribution of mammal species was surveyed in West Sumatra, Riau and Jambi Provinces. The total area is 184,216 km^2 consisted of various landscapes from low to high land and various vegetation types. The eastern part of the island is dominated by lowland and western is highland (Fig. 1)

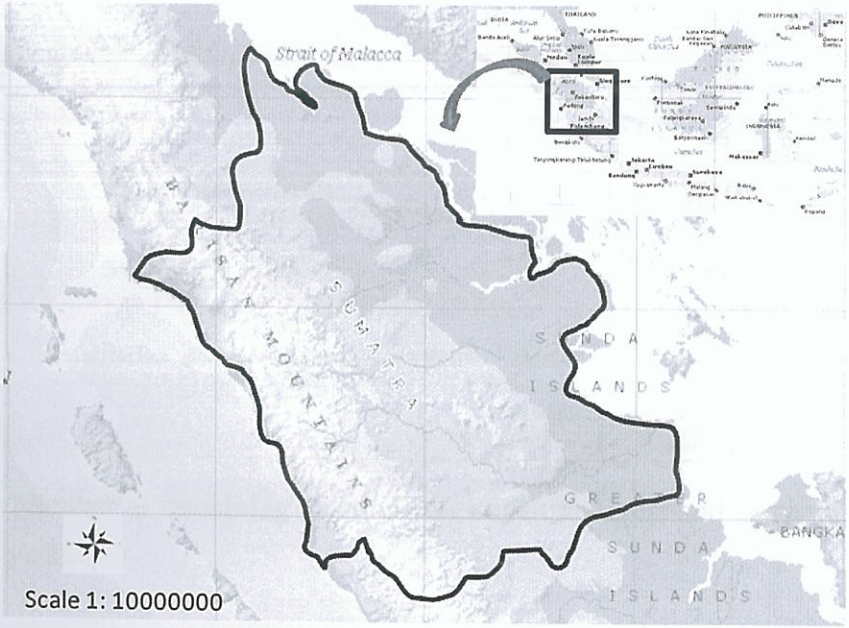

Figure 1: Study area in Sumatra, Indonesia (Solid circle line shows surveyed area in the middle landmass of Sumatra Island).

We did road surveys along main roads and its tributaries to search appropriate respondents for interviews at every 10 to 15 km. We conducted direct observation as much as possible to increase efforts of detecting subject animals. Each location was categorized based on apparent vegetation, either natural or artificial vegetations. The presences of target animal were compared among habitat types, *i.e*: forest reserve, forest, traditional agricultural forest and plantation. The monitoring of agile gibbon population was conducted at a 352 ha forest fragment surrounded by oil palm plantation. Number of individuals and groups were directly counted. Home range size was estimated for each group. We also identified part and plant species eaten by the gibbon. As for the traditional hunting, we observed several hunting events and interviewed with the hunters and host farmers. We evaluated successful killed game compared to the number of hunter involved (party size) and covered area.

Results and Discussion

Distribution of Sumatran tiger and elephant was rapidly decreasing (Fig. 2), Sumatran tiger decreased faster than elephant in the early decades but similar rate at the last two decades.

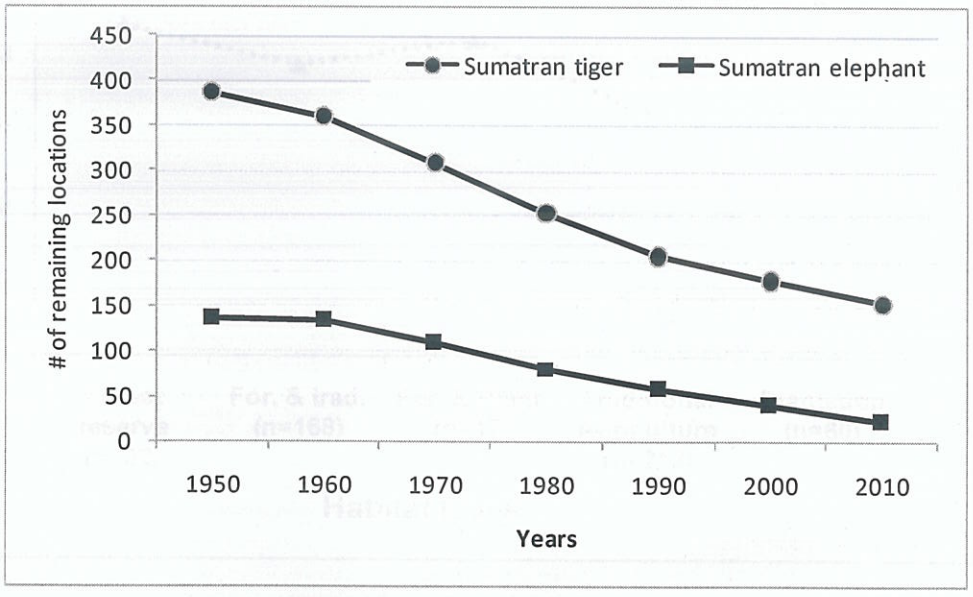

Figure 2: Number of remaining locations for Sumatran tigers and elephants within given years

In the eastern part of surveyed area (*i.e*: Riau and Jambi) was considerably faster because of lowland and gentle slope when oil palm plantation rapidly expanded. As for the tiger, their populations are less fragile than elephant because they could range in mountainous habitat. While elephant depend on lowland very much, this is more preferable for land conversion (Brooks et al. 1999). We could estimate when the extinctions had occurred and put the information into species distribution maps.

Local extinctions of the tiger, elephant and primates have occurred in most surveyed areas since last five decades. On the other hand, palm civet, Asian golden cat, and wild boar might expand their distribution. Wild boar and palm civet are distributed widely even in the cultivated fields (Fig. 3). Common palm civet (*Paradoxurus hermaphrodites*) might live close to human habituated area, where they get benefit from cultivation. While Asian golden cat (*Pardofelis temminckii*) slightly suffered from habitat changes. However, population density of the cat might be higher at the oil palm plantation because its prey (rat, mice and wild dove) more available than forest habitat (Rizaldi *et al.* 2008). Wild boars are also well adapted to the fertilized plantation because their expected foods such as worms are abundant (Dexter, 1999).

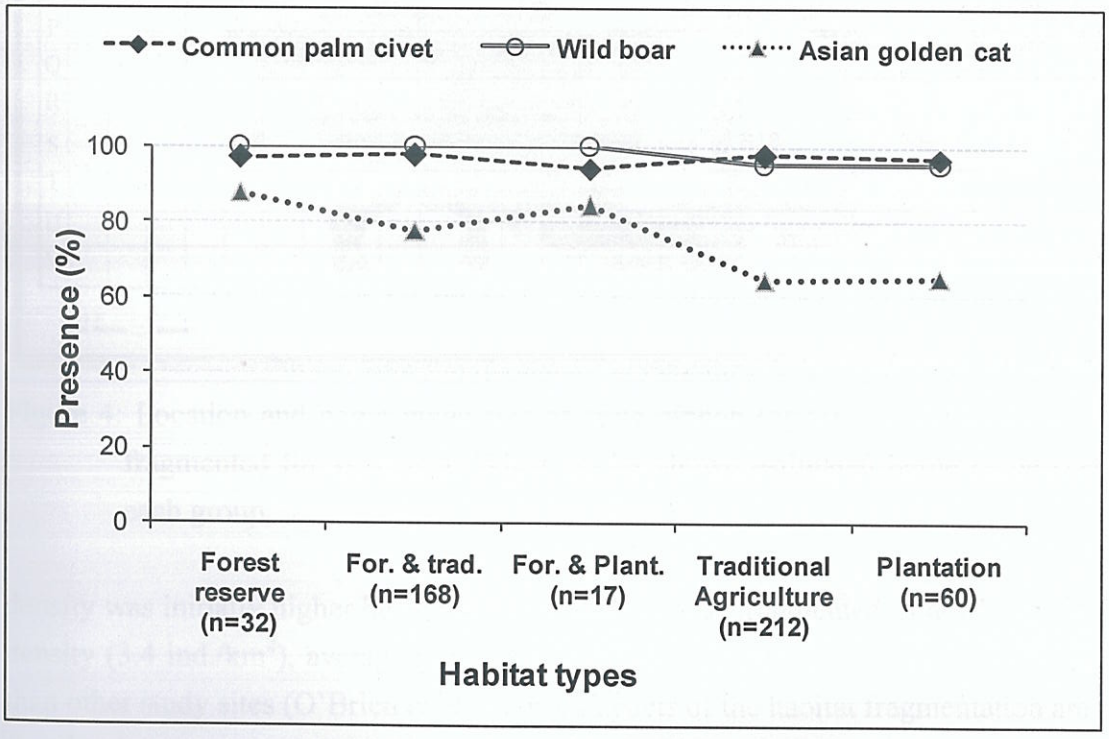

Figure 3: Number of location (%), where the subject animals presented in various type habitats.

The agile gibbons living in fragmented forest were found at high density, small home range and each monogamous group maintains exclusive territory. This crowded population might due to the flock effect during forest cut. Another possibility is that the

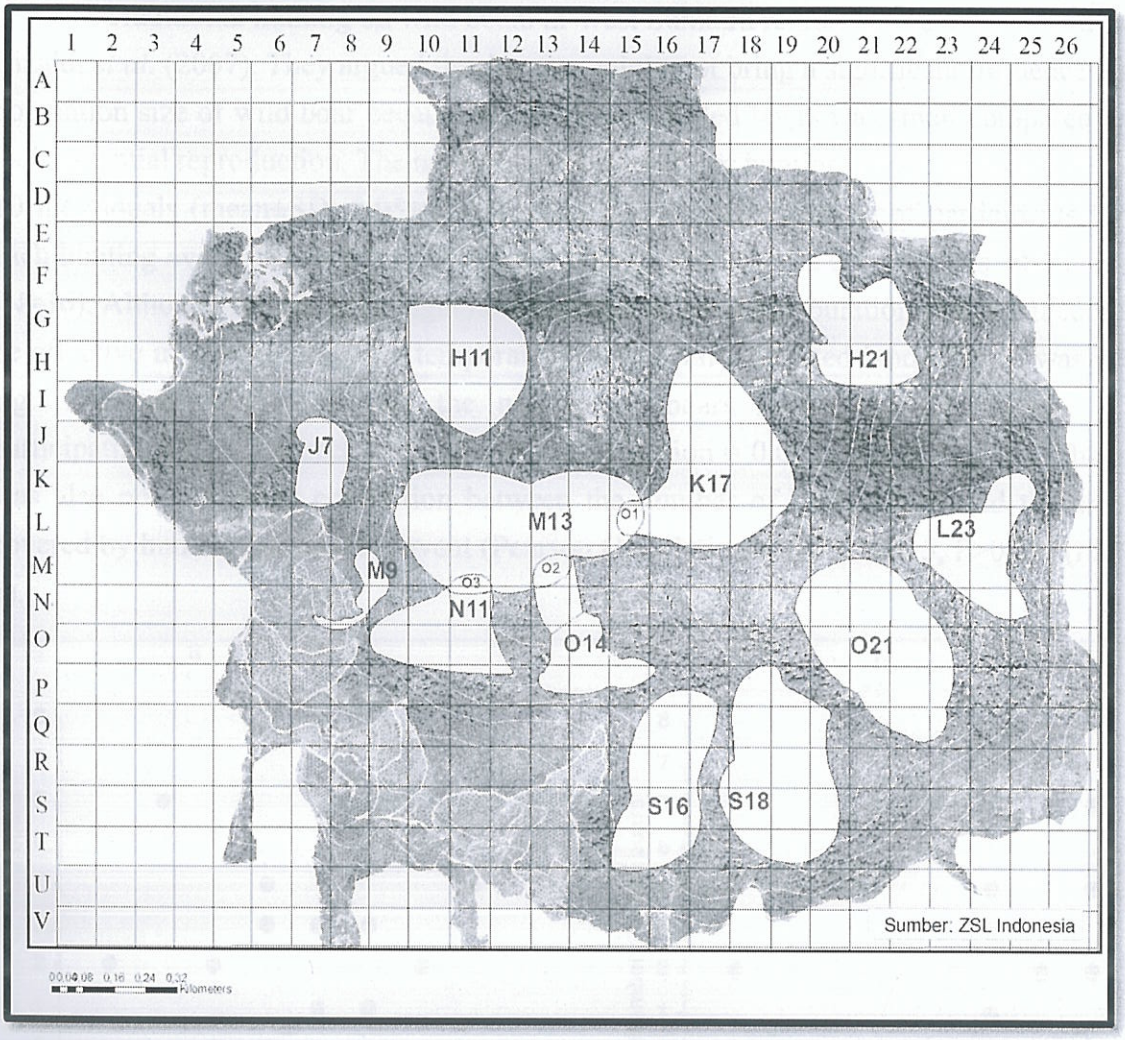

Figure 4: Location and home range size of agile gibbon (*Hylobates agilis*) living in a fragmented forest habitat. White circles shown estimated home range size of each group,

density was initially higher before the forest habitat was fragmented. Indeed, population density (3.4 ind./km^2), average group size (3.3 ind. /group) at this study site are higher than other study sites (O'Brien *et al.*, 2004). Impacts of the habitat fragmentation are not yet clearly pronounced from group size, group structure and density, but such isolated population could not sustain due to limited home range size and food sources and the risk of low genetic variation in the future. Crowded effect to the gibbon's social behavior is something important to be evaluated. Smaller home range size (mean 7.83 ha) and less

overlap (Fig. 4) might indicate that monogamous group strictly maintain their territorial behavior rather than extending to neighboring group range. Such territoriality may intensively proclaim through calling behavior.

Traditional hunting on wild boars in West Sumatra region has been described in Rizaldi *et al.* (2007). They argued that hunting might not bring a significant influence on population size of wild boar because the number of killed boars was small compared to their potential reproduction. The number of boar killed per hunting event varies from 0 to 10 individuals (mean±SD: 3.05±2.44, N=36). The average number of participants for each hunting event was 349.17 (N=36) and average size of area covered was 740.28 ha (N=36)..Although this hunting might not significantly reduce population size, but it could be effective in driving the pests temporarily away from cultivated lands. There was no significant correlation between the number of boars killed and the number of participating hunters in each event (Pearson Correlation = 0.096, N=15, P>0.05). There was also no significant correlation between the number of boars killed and the area covered by hunters during each event (Pearson Correlation= 0.020, N=15, P>0.05) (Fig. 5).

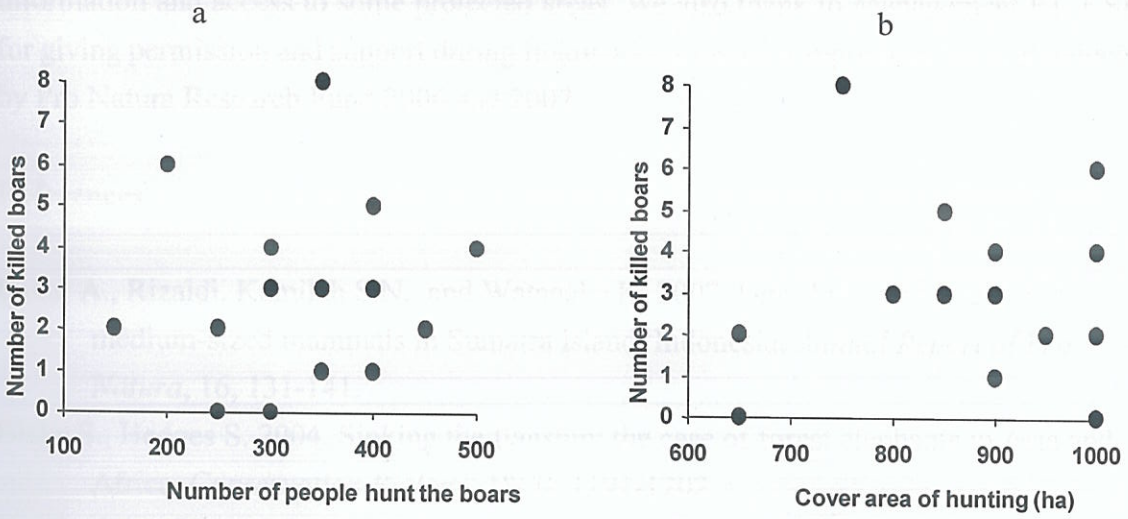

Figure 5: Correlation between number of killed boars and a) number of people participated, and b) covered area on the hunting.

Threats from traditional hunting to the wild boar population have more likely not given significant influence to grow. Potential predators (*i.e.* tiger and leopard) had population decreased and they ranged mainly at forest interior (Rizaldi *et al.*, 2008). On the other hand, their habitat highly varied and utilizations are more effective with day and night activities (Caley, 1997; Dexter, 1999).

To summarize, it is clear that deforestation and forest conversion in Sumatra have caused population decrease to large mammals. Local extinctions have occurred in many locations since last six decades as increasing demand to the land. Other terrestrial mammals, such as wild boar, common palm civet and Asian golden cat have benefited from large scale plantations. Fragmented forest habitat appeared to be serious threats for maintaining sustainable population of exclusive arboreal mammals. Some efforts have to be made to save vulnerable agile gibbons remained in the scattered fragmented forest. Traditional hunting on wild boar may have little ecological impact to the boar. Alternative managements are required to control ubiquitous boar population in Sumatra. This study give us lessons that large mammals could respond deforestation, fragmentation and hunting by different ways, therefore conservation program have to take species concern into account.

Acknowledgments

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References

Bakar A., Rizaldi, Kamilah S.N., and Watanabe K. 2007. Distribution of large- and medium-sized mammals in Sumatra island, Indonesia. *Annual Report of Pro Natura*, 16, 131-141.

Blake S., Hedges S. 2004. Sinking the flagship: the case of forest elephants in Asia and Africa. *Conservation Biology*, 18(5), 1191-1202.

Brooks T.M., Pimm S.L., Kapos V. and Ravilious C. 1999. Threat from deforestation to montane and lowland birds and mammals in insular South-east Asia. *Journal of Animal Ecology* 68, 1061-1078.

Caley P. 1997. Movement, activity pattern and habitat use of feral pigs (*Sus scrofa*) in tropical habitat. *Wildlife Research* 24(1), 77-87.

Donald P.F. 2004. Biodiversity impact of some agricultural commodity production systems. *Conservation Biology* 18(1), 17-37.

Dexter N. 1999. The influence of pasture distribution, temperature and sex on home-range size of feral pigs in semi-arid environment. *Wildlife Research* 26(6),

755-762.

Jepson P., Jarvie J.K., MacKinnon K and Monk K.A. 2001. The end for Indonesia's lowland forest. *Sciences* 292(5518), 859-861.

Kinnaird M.F.,Sanderson E.W., O'Brien T., Wibisono H.T. and Woolmer G. 2003. Deforestation trend in a tropical landscape and implication for endangered large mammals. *Conservation Biology*, 17(1), 245-257.

Macdonald D.W., Tattersall F. H., Service K. M., Firbank L. G. and Feber, R. E. 2007. Mammals, agri-environment schemes and set-aside – what are the putative benefits? *Mammal Review* 37, 259–277.

O'Brien T.G., Kinnaird M.F., Nurcahyo A., Iqbal M. and Rusmanto M. 2004. Abundance and distribution of sympatric gibbons in a threatened Sumatran rain forest. *International Journal of Primatology* 25(2), 267284.

Olson D.M., Dinerstein E., Powel G.V.N and Wikramanayake E.D. 2002. Conservation Biology for The Biodiversity Crisis. *Conservation Biology* 16(1), 1-3

Rizaldi, Watanabe K. and Bakar A.2007. Communal hunting of wildboars (*Sus scrofa*) as a common practice in West Sumatra, Indonesia. *Suiform Sounding* 7(1), 26-30.

Rizaldi, Nurulkamilah S. and Watanabe K..2008. Habitat destruction and threats on the large- and medium-sized mammals in Sumatra, Indonesia. 2008. *Annual Report of Pro Natura*, 17, 223-233.