

Study of mushrooms and wildlife animals biodiversity in the Pongsongkram Community Forestry, Non Sung district, Nakhon Ratchasima

Prayuth Kusolrat¹, Chamaiporn Charoenporn² and Anantagorn Suntornpituk²

ABSTRACT: The Pongsongkram community forestry is located in the center of the village, surrounded by seven villages including Ban Yaka, Ban Nong Hua Rad, Ban Maroom, Ban Mai, Ban Khoksaard, Ban Donmoung and Ban Makha in Non Sung district, Nakhon Ratchasima province. These areas compose of many kinds of forest, such as evergreen forests and deciduous forests. The diversity study of mushrooms and wildlife animals were carried out by surveying once a month during March 2013 to September 2013. Results of the survey revealed totally 26 mushroom species which 23 species could be identified. The identification mushrooms were classified to 15 genera, 10 families and 4 orders. The study of the various types of wildlife was done by interviewing people in the area were hunters and foragers older generation to see a wild animal ever found and a surveying from the research team. The animals were 28 species of animals mammals 11 species, reptiles 12 species and amphibians 5 species can be sampled organisms and found the animal footprints while walking 19 species. They also found traces of the footprints and dung of carnivores, which is expected to be a small civet. The data from this research indicated that Pongsongkram community forestry is still a various living and important community.

Keywords: Pongsongkram community forestry; Mushroom; Wildlife animals

Introduction

Community or participatory forest management has become a popular model for sustainable resource management over the past decade (Skutsch, 2000; Agrawal and Ostrom, 2001). Nowadays, community forestry in Thailand forms an important part of a national strategy for livelihoods improvement and environmental protection. It follows the assumption that if government involves local people by giving them management rights and benefits to the use of forest resources, they will develop a feeling of ownership. They would then be more likely to conserve rather than damage these forest resources, because they

depend on them. Community forestry would also help local people improve their living standards and reduce poverty. The main pillar of the concept is the direct involvement of forest users: the state must be willing to hand over some forest administration power to local communities (Schusser, 2012). Although monitoring and evaluation of forest management is key to success (Sokh and lida, 2001; Wollenberg et al., 2001; Hartanto et al., 2002), most assessments are through the eyes of outsiders rather than of the forest users themselves, using criteria such as forest cover, land use change and floristic composition (Gautam et al., 2004; ChunQian et al., 2005). Whilst forest users have contributed to externally led evaluation

¹ Veterinary Technology Program, Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University, Thailand, 30000

² Agriculture Program, Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University, Thailand, 30000

* Corresponding author: talent_p@yahoo.com , chamaiporn1611@yahoo.com , Anantagorn@hotmail.com

processes such as through the interpretation of aerial photography (Mather, 2000), rapid rural appraisal and responses to forest extraction surveys (Nagendra, 2000; Straede et al., 2002).

Pongsongkram sub-district is located in Non Sung district, 45 kilometers away from Nakhon Ratchasima province to the northeast. It consists of 15 villages under the supervision of the Pongsongkram subdistrict municipality. The villagers mainly engaged in agricultural farming, 80 percent relies on natural rainwater into the mainstream. Within this community they have interesting region which people in many villages also sharing benefits. The Pongsongkram community forestry is an important area which is a sparse and mixed forest. The locals have been used many advantages such as a food source from both hunting and gathering wild plants which can be sold to sustain life. Furthermore, it is provided good environment and some plants in this forest can be used in a folk medicine. From interviews with locals to see that for a long time this area has a variety of wildlife whether the mammals, reptile and amphibian. Such as jackal, wild rabbits, squirrel, civet and various snakes have been trapped by people and some of them were raised as pets. Presently, this area is under threatened from 1) invasion of surrounding communities 2) utilization in a private area next to the forest as a source of pollution, making the smell from garbage 3) illegal logging as firewood and charcoal and 4) collection of wild without control and picking some plant to distribute.

The circumstances mentioned above initiate to negotiate between the community if anyone has not realized the important of community forestry and finding guidelines to exploit the forest

together. Including, the conservation and maintenance lack of continuity and tangible which make the forest devoid of the rich and beneficial to the community in the short term. The effects of all reasons may result in changes to a variety of creatures. Thus, this research is based on qualitative action research conducted within a wider participatory research project which aimed to evaluate species diversity of mushroom and animal wildlife in Pongsongkram community forestry. In order to know a status of the living especially, the things that people have been exploited. It is expected that the information from this study will be useful in the management of Pongsongkram community forestry and villager recognized and appreciated the importance of natural resources whether plant, fungi or animal.

Materials and Methods

Research site and participants

This study has been designed to apply the qualitative method that deployment a survey of research team combined with emphasis on a participatory approach, observation by having the community participate in the process. The research was conducted in Pongsongkram community forestry, Non Sung district from January 2013 to August 2013 (**Figure 1**). Research groups are made up of 60 respondents, consisting of community leaders, both official bureaucratic leaders and influential leaders such as highly respected and recognised senior members and religious or spiritual leaders, village members, school teachers and other stakeholders in the community forestry.

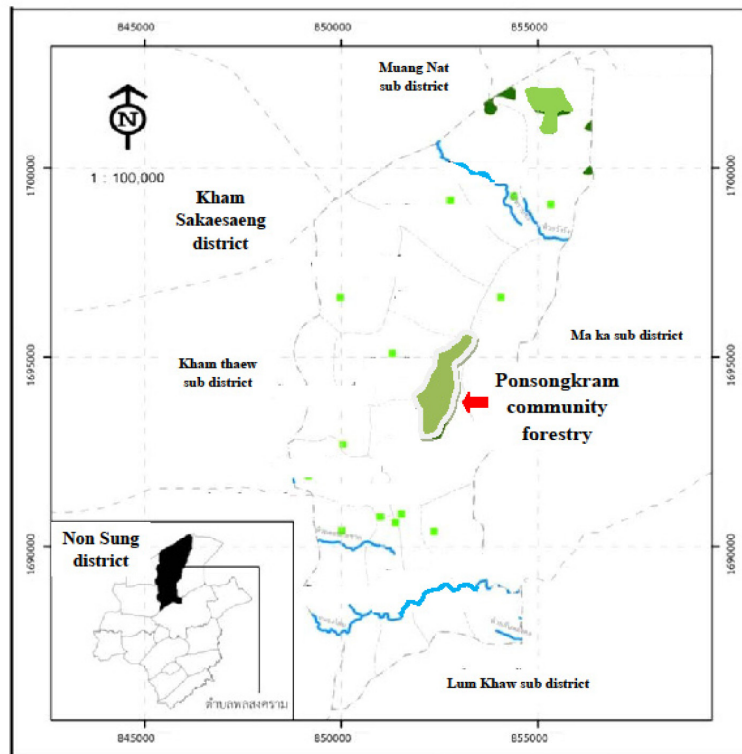


Figure 1 Map of a Pongsongkram community forestry, Non Sung district, Nakhon Ratchasima province. Green area represents a collecting sample location.

Survey of mushrooms

Different genera of wild mushrooms were collected from various locations in Pongsongkram community forestry during the period of rainy season from June 2013 to August 2013. Standard methods of collection, preservation and identification were followed. Samples were collected from their natural sites and kept for laboratory identification. The collected fruiting bodies were identified according to text books (Ruksawang and Flegel, 2001; Chandrasrikul et al., 2011). The photographs were made by digital camera. The descriptions, habitats are mentioned in description section of recorded genus.

Survey of wildlife animals

For the evaluation of wildlife animals, we established eight plots of 20 m × 150 m between kilometer point. Each plot consisted of two parallel lines separated by 15–20 m, and placed two traps at each sampling station and assigned a number to each. Evaluations consisted of three consecutive trapping nights every month. We checked traps in the early morning and baited them in the afternoon (Ahumada et al., 2014) and estimated dispersion and rarity of species using the capture frequency per plot (e.g., the number of plots where the species was captured). We established the following categories of relative

abundance: (1) rare, less than 1% capture rate, (2) less abundant, 1%–10% capture rate, (3) abundant, 10%–40% capture rate, and (4) very abundant, more than 40% capture rate (Ahumada et al., 2014). Evaluated status followed by IUCN 2011 (IUCN, 2000, 2006), ONEP 2005.

Results and Discussion

Our results provide a baseline information of mushroom and terrestrial animal in Pongsongkram community forestry. The data presented in **Figure 2** and **Table 1** illustrate the distribution and diversities of wild mushrooms which were collected during June 2013 to August 2013. The sampling sample is a sparse forest and it is found mushroom in the area between the Ban Don Muang and Ban Yaka. The identification mushrooms were classified as edible and inedible mushrooms; 15 genera, 10 families and 4 orders. All of them were divided into 4 groups according to their roles and functions in the forest ecosystem such as decomposed mushrooms 4 species, ectomycorrhizal mushrooms 11 species, termite mushrooms 1 species and unknown roles and function 7 species. Some kinds can be edible such as *Russula densifolia*, *Termitomyces tyleranus*, *Tricholoma termitomycooides*, *Boletus chrysenteron*, *Amanita hemibapha*, *Russula virescens*, *Vascellum pratense*, *Pisolithus tinctorius*, *Craterellus aureus*, *Strobilomyces seminudus*, *Macrolepiota gracilentia*, *Russula fragrantissima*, *Boletus griseipur-*

pureus, *Lactari piperatus* and *Amanita vaginata*. And which much more it will be sold at the village market that produces more income for the family. Unfortunately, mushrooms picking can be done in the rainy season as a short period of 3-4 months.

Some of these species are similar to previous reports by several workers. Chin (1988) recorded that twenty species of edible and poisonous mushrooms were collected from forests in Sarawak of the poisonous mushrooms were *Amanita excelsa*, *A. phalloides*, *A. pantherina*, *Clitocybe* sp. and *Nathopanus* sp. were included (Chin, 1988). In Thailand, Chanopas (2006) reported Ascomycotina and Basidiomycotina at Doi Weang La Wildlife Sanctuary in Mae Hong Son province. The Ascomycotina was classified into 9 families, 12 genera and 19 species while Basidiomycotina was classified into 158 species, 76 genera and 26 families (Chanopas et al., 2006). However, there are some differences in the number of species which may be consequent from size, ecological characteristics and time period of the study. A part from that, Supanee et al. (2013) was explored a variety of mushrooms in the Sirindhorn community forestry, Ubon Ratchathani found 65 samples, the edible mushrooms 15 families, 21 genera, 45 species, the most common genus *Russula* mushroom garden. Inedible found 15 species. It can be seen that mushroom diversity is similarly in this research.

Table 1 Characterization of mushroom were conducted in area of Pongsongkram community forestry, Non Sung district, Nakhon Ratchasima province during June 2013 to August 2013.

Genus	Species	Sap	Ect	Ter	Par	Unk
Order : Agaricales						
Family : Amanitaceae						
1. <i>Amanita</i>	<i>vaginata</i>		✓			
2. <i>Amanita</i>	<i>hemibapha</i>		✓			
Family : Lycoperdaceae						
1. <i>Vascellum</i>	<i>pratense</i>					✓
Family : Tricholomataceae						
1. <i>Tricholoma</i>	<i>termitomycoides</i>			✓		✓
2. <i>Termitomyces</i>	<i>tyleranus</i>	✓				
3. <i>Trogia</i>	<i>infundibuliformis</i>					✓
Family : Cortinariaceae						
1. <i>Psilocybe</i>	<i>subaeruginascens</i>		✓			
2. <i>Inocybe</i>	<i>caesariata</i>					
Family : Corpinaceae						
1. <i>Copelandia</i>	<i>cyanescens</i>					✓
Family : Agarinaceae						
1. <i>Macrolepiota</i>	<i>gracilentia</i>	✓				
Family : Marasmiaceae						
1. <i>Marasmius</i>	<i>androsaceus</i>	✓				✓
2. <i>Marasmius</i>	<i>berteroi</i>	✓				
3. <i>Marasmius</i>	<i>arborescens</i>					
Order : Boletales						
Family : Bolelaceae						
1. <i>Boletus</i>	<i>griseipurpureus</i>		✓			
2. <i>Boletus</i>	<i>chrysenteron</i>					✓
3. <i>Strobilomyces</i>	<i>seminudus</i>		✓			
Family : Sclerodermataceae						
1. <i>Pisolithus</i>	<i>tinctorius</i>		✓			
Order : Canthorellales						
Family : Cantharellaceae						
1. <i>Craterellus</i>	<i>aureus</i>		✓			
Order : Russulales						
Family : Russulaceae						
1. <i>Lactarius</i>	<i>piperatus</i>		✓			
2. <i>Russula</i>	<i>fragrantissima</i>					✓
3. <i>Russula</i>	<i>emitica</i>		✓			
4. <i>Russula</i>	<i>virescens</i>		✓			
5. <i>Russula</i>	<i>densifolia</i>		✓			

Sap: saprophytic mushroom, Ect: ectomycorrhizal mushroom, Ter: termite mushroom, Par: plant parasitic mushroom, Unk: unknown function mushroom.



Figure 2 Represent all species of mushrooms in area of Pongsongkram community forestry, Non Sung district, Nakhon Ratchasima province during June 2013 to August 2013.

In addition, we studied biodiversity of wildlife animals at the same area between March 2013 to September 2013 by interviewing hunter people as well as cooperation surveyed with the villagers. The traps were placed onto the sampling area including the netting on the route expected that animals move through. Our results found the total

28 species; 11 species of small mammals, 12 species of reptiles and 5 species of amphibians can be sampled organisms and found the animal footprints while surveying 19 species including foxes, hares, variable squirrels, treesheiw, mon-gooses, roof rats, palm civets, flying lemurs, frogs, caecirian, green frogs, balloon frogs, toads, ori-

ental whip snakes, Indochinese rat snakes, sun-beam snakes, common sun skinks, forrest skink and curve toe geckoes and some wildlife animals that are not found by the survey including small indian civet, large indian civet, mask palm civet, bandedkrait, malayan pit viper, cobra, reticulate python, green pit viper and copperhead racer. They also found traces of the footprints and dung of carnivores, which are expected to be a small civet (Figure 3, Table 2).

The results of this study support the concept that areas which are connected with large forest

areas will be to maintained species diversity of mammals, more than a small forest. It can be applied to managing forests for conservation linkage to be large enough to hold the balance of forest ecosystems. In terms of handling small mammal populations, it should consider the changes in habitat. Because if there is a change in their living environment that is conducive to this type of animal. As a result, the population of this species is rapidly increasing, and the effect on the region itself and the wildlife species and human beings.

Figure 3 A, B; Footprint of some carnivorous found after rain, C; Golden jackal (*Canis aureus*) were trapped by the villagers and D; Variable squirrel (*Callosciurus finlaysoni*).

Table 2 Species of wildlife animals found at Ponsongkram community forestry, Non Sung district, Nakhon Ratchasima province during March 2013 to September 2013.

No	English common name	Scientific name	Status			
			IUCN 2011	ONEP 2005	CITES	Rarity
1	Golden jackal	<i>Canis aureus</i>	LC	VU	Appendix III (India)	2
2	Siamese hare	<i>Lepus peguensis</i>	LC	-	-	3
3	Valuable squirrel	<i>Callosciurus finlaysoni</i>	LC	VU	-	3
4	Northern treeshew	<i>Tupaia belangeri</i>	LC	-	-	3
5	Small Indian civet	<i>Viverricula indica</i>	LC	-	Appendix III (India)	2
6	Large Indian civet	<i>Viverra zibetha</i>	NT	-	Appendix III (India)	1
7	Small Asian mon-goose	<i>Herpestes javanicus</i>	LC	-	Appendix III (India)	3
8	Roof rat, Black rat	<i>Rattus rattus</i>	LC	-	-	4

No	English common name	Scientific name	Status			
			IUCN 2011	ONEP 2005	CITES	Rarity
9	Common palm civet	<i>Paradoxurus hermaphroditus</i>	LC	-	Appendix III (India)	1
10	Mask palm civet	<i>Paguma larvata</i>	LC	-	Appendix III (India)	1
11	Malayan flying lemur	<i>Galeopterus variegatus</i>	LC	-	-	3
12	East asian bullfrog	<i>Hoplobatrachus rugulosus</i>	LC	-	-	4
13	Caecilian	<i>Ichthyophis</i> sp.	-	-	-	3
14	Common green frog	<i>Hylarana erythraea</i>	LC	-	-	2
15	Balloon frog	<i>Glyphoglossus molossus</i>	NT	-	-	4
16	Toad	<i>Duttaphrynus melanostictus</i>	LC	-	-	4
17	Bandedkrait	<i>Bungarus fasciatus</i>	LC	-	Appendix II	2
18	Malayan pit viper	<i>Calloselasma rhodostoma</i>	-	LC	Appendix III (India)	2
19	Cobra	<i>Naja</i> sp.	-	LC	Appendix II	3
20	Reticulate python	<i>Python reticulatus</i>	-	LC	Appendix II	3
21	Green pit viper	<i>Trimeresurus</i> sp.	-	LC	-	2
22	Oriental whipsnake	<i>Ahaetulla prasina</i>	LC	-	-	3
23	Indochinese rat snake	<i>Ptyas korros</i>	-	LC	-	4
24	Sunbeam snake	<i>Xenopeltis unicolor</i>	-	LC	-	4
25	Copperhead racer	<i>Elaphe</i> sp.	-	LC	-	2
26	Common sun skink	<i>Eutropis multifasciata</i>	-	-	-	4
27	Forrest skink	<i>Eutropis macularia</i>	-	NT	-	4
28	Curve - toed gecko	<i>Cyrtodactylus</i> sp.	-	NT	-	3

IUCN 2011 : International Union for Conservation of Nature Red list (EN - Endangered species; VU - Vulnerable species; NT - Near Threatened ; LC - Least Concern)

ONEP 2005 : Office of Natural Resources and Environmental Policy and Planning (EN - Endangered species; VU - Vulnerable species; NT - Near Threatened ; LC - Least Concern)

CITES : Convention on International Trade in Endangered Species of Wild Fauna and Flora (Appendix I), (Appendix II), (Appendix III)

Rarity : (1) rare, less than 1% capture rate, (2) less abundant, 1%–10% capture rate, (3) abundant, 10%–40% capture rate, and (4) very abundant, more than 40% capture rate

The status of wildlife in Pongsongkram community forestry as follows, according to the IUCN (IUCN, 1996, 2000, 2006) found two species belong to the animal Near Threatened (NT) such as large Indian civet (*Viverra zibetha*) and balloon frog (*Glyphoglossus molossus*). The reason that Indian civet classified in this group as the results of both the environment and the food is not appropriate for existence. The balloon frog is disturbed by the consumption of local people. In addition, the other wildlife belongs to Least Concern (LC) group. And if they are divided by the Natural Resources and Environmental Policy and Planning criteria (IUCN, 2000) found that there are 2 species that classified in the Vulnerable species (VU) such as valuable squirrels (*Callosciurus finlaysoni*) and golden jackal (*Canis aureus*). And wildlife as Near Threatened (NT) has 2 species as forest skink (*Eutropis macularia*) and curve-toed gecko (*Cryptodactylus* sp.). Moreover, considering the CITES appendix II found 2 species including cobra (*Naja* sp.) and reticulate python (*Python reticulatus*), CITES appendix III compose of small Indian civet (*Viverricula indica*), large Indian civet (*Viverra zibetha*), small Asian mongoose (*Herpestes javanicus*), common palm civet (*Paradoxurus hermaphroditus*), mask palm civet (*Paguma larvata*) and Malayan pit viper (*Calloselasma rhodostoma*) (IUCN, 2006).

In conclusion, the study of biodiversity in Pongsongkram community forestry revealed that these areas still be a various living. Although, the community can recover previously degraded

forests to have abundance, but with current forest management or natural resources in the community depends on the situation and the environment which are always changing. Therefore, the approach accommodates the change by creating a network of community forests in the district. For agreement the knowledge and the strengthening of community forest management and current forest management by communities alone may not be enough. Biodiversity is valued in many ways by community forest users, and the use of a multidimensional framework to guide facilitators in action research help participants identify and communicate values that go beyond the utilitarian, and beyond individual species. While this helps to show that community and conservation stakeholders have more in common than is often recognised, it also helps to identify areas where conservation action can support community forestry, and where complementary action is needed. We need to find ways to provide support to community forest management is more efficient from all sectors both government and local residents. We hope that these data contribute to a better management and conservation of these populations and species in the future.

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