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Preliminary survey of freshwater fishes from acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, Thailand

Nidsaraporn Petsut[1*], Sitthi Kulabtong[2], Jirawaeth Petsut[1]

[1]*Department of Agricultural Technology, Faculty of Science, Ramkhamhaeng University, Bangkok 10240, Thailand*

[2]*Save wildlife volunteer Thailand, Wangnoi District, Ayuttaya Province 13170, Thailand*

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Abstract

Species diversity and distribution pattern of freshwater fishes from Nakhon Nayok Province, acid soil area in upstream of Bangpakong River, east of Thailand, were investigated in relation to environmental conditions between September-October 2012. The freshwater fishes samples and environmental factors were collected monthly, at 3 sampling stations. A total of 23 species, 8 families and 4 orders of freshwater fishes were recorded, of which 11 species of family Cyprinidae were the most diverse group. The predominant fishes in this area included *Rasbora* spp., *Boraras* sp., *Esomus metallicus*, *Amblypharyngodon chulabornae*, *Pristolepis fasciata* and *Trichopsis* spp.

***Corresponding Author:** Nidsarporn Petsut ✉ nidsaraporn@ru.ac.th

Introduction

Bangpakong is one of the river located in the east of Thailand. With a length of 122 kilometers. The people in Prachin Buri, Nakorn Nayok, and Chachoengsao provinces use the water mainly for municipal supplies, irrigation, aquaculture, animal farming and for industry, it is considered the main river in eastern Thailand (Bubphamala *et al.*, 2010). Along the line of the river, there are many different type of ecosystem including acid soil and estuaries areas. Because of the properties of area features and environmental diversity, Bangpakong river, especially acid soil area at Nakorn Nayok provinces has remarkably diverse freshwater fishes (Vidthayanon, 2002).

Currently, the abundance and diversity of freshwater fishes in upstream of Bangpakong River has been vulnerable to decline because of changing in ecology including environmental condition and land-use activities. (Leadkasetvidthaya and sawangareeruk, 2006). The need to promote of fishes resource management is therefore important for sustainable conservation.

In spite of the numerous publications of fishes biodiversity patterns are limited, which in turn limits formulation of biodiversity conservation strategies (Vidthayanon *et al.*, 1997). In this study, we attempt to collect information on freshwater fish biodiversity at acid soil area in the upstream of Bangpakong River ,Nakorn Nayok Province. The purposes of the present study are (1) to characterize patterns of species diversity of fishes and (2) to propose the preliminary management strategies for conservation of fishes resources at acid soil area in upstream of Bangpakong River, Nakorn Nayok Province, Thailand.

Materials and methods

Species diversity study

Collected the specimens by beach seine size 1.2 m. x 10 m. and mesh size 1 mm. x 1 mm. at Pakpee District, acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, east of Thailand (Fig. 1-2) during September-October 2012. All specimens will preserve in 10 % of formalin solution. Thereafter send the specimens to examine in a laboratory. Sorting and identify the specimens by use the taxonomical documents that relate such as Smith (1945), Rainboth (1996) and Kottelat (2001) etc. In this study the authors hold the morphological character for identifying the specimens. Taxonomic arrangements follow Nelson (2006). All specimens of freshwater fishes in this study are deposited into the Reference Collection of Aquatic biology, Ramkhamhaeng University, Bangkok, Thailand [RU 0070 - 0089].

Table 1. Species diversity of freshwater fishes at acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, Thailand between September and October 2012

Order	Family	Species
Cypriniformes	Cyprinidae	Rasbora sp.
		Rasbora borapetensis
		Rasbora rubrodorsalis
		Boraras sp.
		Esomus metallicus
		Amblypharyngodon chulabornae
		Puntius brevis
		Puntius rhombeus
		Cyclocheilichthys apogon
		Cyclocheilichthys armatus
		Osteochilus hasselti
		Labiobarbus siamensis
	Cobitidae	Lepidocephalichthys furcatus
Beloniformes	Oryziidae	Oryzias minutillus
Synbranchidae	Synbranchidae	Monopterus albus
Perciformes	Nandidae	Pristolepis fasciata
	Osphronemidae	Trichopsis pumila
		Trichopsis vittata
		Trichogaster trichopterus
		Trichogaster pectoralis
	Eleotridae	Oxyeleotris marmorata
	Channidae	Channa lucius
		Channa striata

Table 2. Average water quality parameters at acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, Thailand between September and October 2012.

Water quality	Parameter
Temperature (°C)	31.0
Transparency (cm)	72.5
pH	6.0
Alkalinity (mg/l as $CaCo_3$)	38.3
Ammonia (mg/l as Nitrogen)	0.047
Nitrite (mg/l as Nitrogen)	0.169
Nitrate (mg/l as Nitrogen)	0.32
Hardness (mg/l as $CaCo_3$)	36.0
Orthophosphates (mg/l as Phosphorus)	0.022

Physical and chemical factors study

Physical parameters were recorded at the time of each destructive sampling. Water temperature using a thermometer, pH was measured using a pH meter (YSI Model 60). In addition, transparency was measured using a secchi disk. Water samples from each study sites in plastic bottles and fixed in ice chests to investigate for Alkalinity, Hardness, Ammonia, Nitrate, Nitrite and Phosphate (APHA *et al.*, 2009)

Results and discussion

Species diversity

23 species, 8 families and 4 orders (i.e., Cyprinidae, Cobitidae, Oryziidae, Synbranchidae, Nandidae, Osphronemidae and Channidae) were found (Table 1). Family Cyprinidae shown more species number (11 species) namely 3 species of Rasbora spp., Boraras sp., Esomus metallicus, Amblypharyngodon chulabornae, Puntius rhombeus, Cyclocheilichthys apogon, Cyclocheilichthys armatus, Osteochilus hasselti and Labiobarbus siamensis. In this study area Rasbora spp., Boraras sp., Esomus metallicus, Amblypharyngodon chulabornae, Pristolepis fasciata and Trichopsis spp. are dominance species and width distribution in this area, inferior to Oryzias minutillus and Puntius rhombeus.

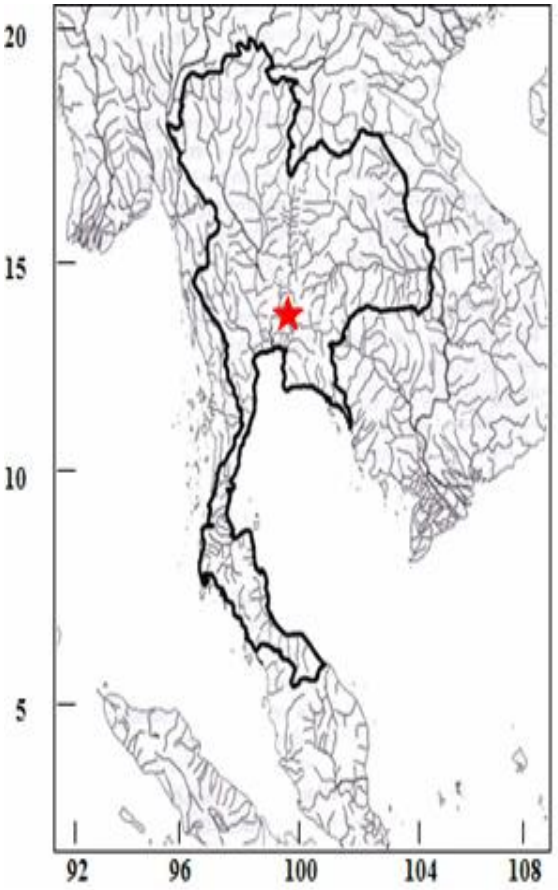

Fig. 1. Study area: acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, Thailand

In study area, O. minutillus, Trichopsis spp., R. borapetensis, R. rubrodorsalis, and Boraras sp. are dominance species in quantity follow by P. fasciata and T. pectoralis etc. Mainly fishes found in study area are similarly with peat swamp fishes in reported of Vidthayanon (2002) such as T. pectoralis and Boraras sp. are found in water source with low pH only (pH<7.0) but, mainly other fishes are highly adaptation skill it can live in many ecosystem such as Trichopsis spp. and R. borapetensis, both fish can found between headwater stream to main stream and still water (Rainboth, 1996; Kulabtong and Kunlapapuk, 2011).

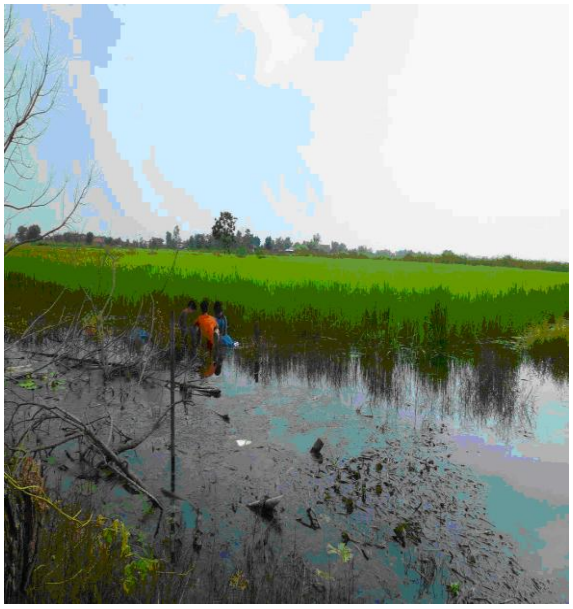

Fig. 2. Acid soil area in upstream of Bangpakong River, Nakhon Nayok Province, Thailand

Water quality parameters

Average water quality in study sites were investigated (Table 2). The water temperature was 31.0 ^{o}C. The Transparency was 72.5 cm. The Alkalinity was 38.3 mg/l. The Hardness was 36.0 mg/l. While pH value, one of the chemical water qualities, was relatively low (pH<7.0). In addition, the Orthophosphates was 0.022 mg/l. and TIN (total inorganic nitrogen: NH_4^+ +NO_3^- +NO_2^-) was 0.436 mg/l. The results showed that all water qualities were suitable for the growth of aquatic animals (Boyd, 1982),

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