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Molluscs in the Ubolratana Reservoir, Khon Kaen

Rachadaporn Kittivorachate[1] **and Chintana Yangyuen**[2]

ABSTRACT

The study was conducted six times between 1999 and 2000. Five stations were chosen covering all areas of the Ubolratana Reservoir. There were 15 families and 69 species of molluscs with *Melanoides tuberculata* as the dominant species. The highest density was the Family Thiaridae at 47 – 76 % annually, and the rarest was Family Hydrobiidae. Maximum numbers of mollusc were found in front of the reservoir station. At the depth of 0.5 to 2.0 meters molluscs were widely distributed. The population varies gradually throughout the year but decreased noticeably in December. The fishing operation and animal migration were the main cause of mollusc quantity dropping.

Key words : molluscs, distribution, Ubolratana Reservoir

INTRODUCTION

The Ubolratana Reservoir, Khon Kaen is a major water resource in the northeastern part of Thailand. It is located at 16° 35' – 16° 50' N and 102° 20' – 102° 35' E. (Bd. Agri. Econ., 1999) and 410 square kilometers in area with 2,550 million cubic meters in water volume (The Royal Institute, 1978). The reservoir is a major site for fisheries resources with a production of 19.68 and 11.4 kg/ 1600m^2 in 1978 and 1979(EGAT, 1978 and EGAT, 1979). In the study on benthic fauna in Ubolratana reservoir between 1999 and 2000, molluscss were found in large quantity. This is an interesting information as molluscs is a primary source of food especially in the northeastern area. Studying the molluscs in this area was considered important. Specimens were collected from 5 stations at 4 various depths and were considered as being representative of the reservoir. The main survey focused upon molluscs species composition, community structure and distribution in various areas and at different depths. Therefore, the aim of the investigation was to understand of a major part of the ecosystem.

MATERIALS AND METHODS

The operations were carried out six times at two months interval from August 1999 to June 2000. Five sampling stations were chosen, the first and second stations were in the Choen canal branch, the fourth and fifth stations were in the Nam Pong canal branch and the third station was at the front of the reservoir (Figure 1). At each station, 3 samples (replications) were collected at each selected depth, for 4 depths; 0.5, 2.0, 5.0 and 8.0 meters.

The 15 × 15 cm Ekman grab was used for sampling the reservoir bottom soil. A standard US

1 Inland Fisheries Environment Research and Development Unit, Department of Fisheries, Bangkok 10900, Thailand.

2 Ubolratana Reservoir Fisheries Resources Research and Development Unit, Department of Fisheries, Bangkok 10900, Thailand.

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no. 30 seive (595 micron mesh size) was used for retaining the specimens. All specimens were preserved in 5-10 % formalin and then identified under both high and low power microscopes at the laboratory of the Inland Fisheries Environment Unit, Department of Fisheries. Taxonomic principle analyses were conducted using 5 reference books: Brandt (1974); Needham (1964); Fitter and Manuuel (1986); Edmondson *ed*. (1963); and Charanthada (1971).

RESULTS AND DISCUSSION

1. Species composition of the molluscs in the Ubolratana reservoir

The collected molluscs were identified and classifeid into 2 classes, 7 orders, 15 families, 32 genera and 69 species. The details are as follows. :-

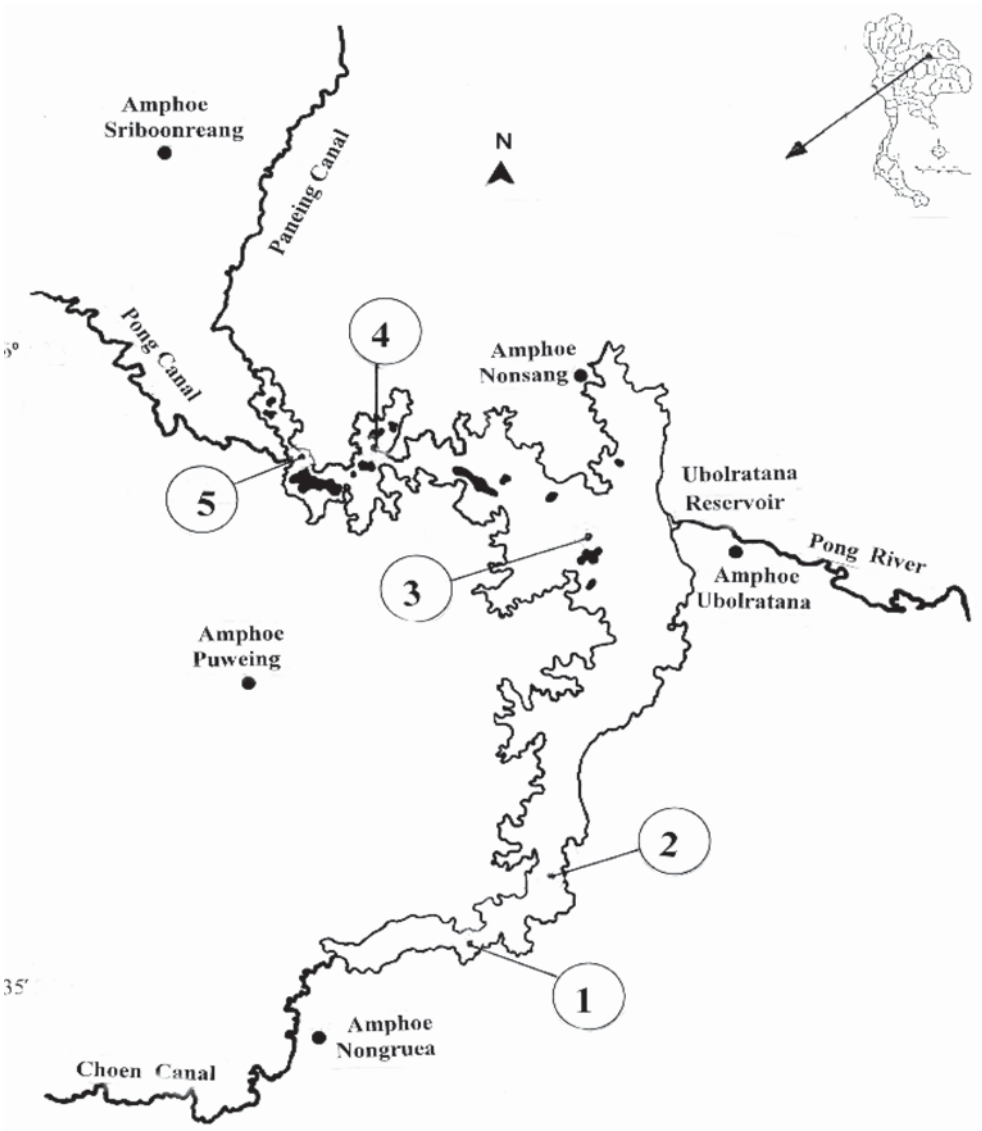

Figure 1 Ubolratana Reservoir, Khon Kaen province, with 5 stations.

Phylum Mollusca

Class Gastropoda

Order Mesogastropoda

Family Bithyniidae

Wattebledia crosseana	*Wattebledia siamensis*
Bithinia walkeri	*Bithinia pygmaea*
Bithinia siamensis	*Bithinia* sp.

Family Viviparidae

Subfamily Bellamyinae

Filopaludina martensi	*Filopaludina (filopaludina) doliaris*
Filopaludina maekoki	*Filopaludina munensis*
Filopaludina cambodjensis	*Filopaludina sumatrensis speciosa*
Filopaludina javanica	*Filopaludina mandahlbarthi*
Filopaludina sp.	*Trochotia trochoides*
Sinotiaia mandahlbarthi	*Sinotiaia arturrolli*
Indopoma dissimilis	*Anulotaia* sp.
Makongia swainsoni flavida	*Makongia swainsoni braueri*
M. pongensis	
Pila pesnei	*Pila ampullacea*

Family Assimieneidae

Subfamily Assimieneinae

Assiminea spiralis	*Assiminea abbotti*
Assiminea microsopica	*Assiminea (Macrassimena)* sp.

Family Stenothyridae

Stenothyra ovalis	*Stenothyra microsculpta*
Stenothyra (koratensis) koratensis	*Stenothyra. roseni*

Family Hydrobiidae

Subfamily Lithoglyphinae

Pachydrobia munensis	*Paraprososthenia levayi*

Family Thiaridae

Subfamily Thiarinae

Melanoides tuberculata	*Thiara scabra*
Tarebia granifera	*Sermyla riqueti*

Order Neogastropoda

Family Buccinidae

Clea helina	*Clea scalarina*
Clea wykoffi	

Order Basommatophora

Family Planorbidae

Subfamily Segmentininae

Segmentina sp.

Subfamily Amerianninae

Amerianna sp.

Subfamily Planorbinae
Gyraulus rotula
Family Lymnaeidae
Lymnaea (Radix) auricularia rubiginosa
Lymnaea auricularia swinhoei
Lymnaea sp.
Family Bulinidae
Indoplanorbis exustus

Class Bivavia
Order Arcoida
Family Arcidae
Scaphula pinna
Order Venerina
Family Corbiculidae
Corbicula occidentiformis
Corbicula moreletiana
Corbicula bocourti
Corbicula fluminea
Corbicula iravadica
Corbicula tennis
Corbicula vokesi
Corbicula arata
Corbicula leviuscula
Corbicula blandiana
Corbicula. lydigiana
Corbicula lamarkiana
Corbicula castanea
Corbicula solidula
Corbicula cyreniformis
Corbicula sp.
Order Unionoida
Family Amblemidae
Subfamily Pseudodontinae
Pilsbryoconcha exilis exilis
Pilsbryoconcha exilis compressa
Subfamily Parreysiinae
Scabies phaselus
Scabies crispata
Scabies nucleus
Indonai humilis
Indonaia sp.
Subfamily Rectidentinae
Ensidens ingallsiamus dugasti
Physunio modelli
Physunio sp.
Subfamily Hyriopsinae
Hyriopsis (Limnoscapha) sp.
Family Margaritiferidae
Margaritanopsis laosensis
Order Mytiloida
Family Mytilidae
Limnoperna siamensis

These collected molluscs were similar to those found from the benthos of Pong, Chi and Mun rivers after the water pollution crisis in 1992. Fourteen genera were exactly the same (Rachadaporn and Saowakon, 1992) and rather similar to those found nearby the cage culture site in the Mun river (Pinit *et al*., 2000). Molluscs in northeastern water resources are expected not to be very different in species composition.

2. Community structure

The structure of the molluscs community was composed of 15 families. Family Thiaridae was the most abundant contributed to 47 to 76 % annually. Family Corbiculidae and Family Bithyniidae were the second and the third in number. The rarest was Family Bulinidae with only 0 to 0.18 percent annually. The population in June was highest in density but in December was the lowest (Table 1). Kruskal – Wallis test (Charan and Anandtachai, 1992) was introduced for consideration. There were no significant difference ($p>.05$) between months of same species but were different between species in the same month.

3. Distribution

The molluscs were found scattered in all stations with total numbers of 4,543; 2,739; 1,617; 1,341 and 557 individual/m^2 at station 3, 4, 1, 2 and 5, respectively. The 5 most dominant molluscs species in Ubolratana Reservoir were *Melanoides tuberculata, Tarebia granifera, Wattebledia crosseana, Corbicula bocourti* and *Thiara scabra* with the numbers of 5,079; 1,809; 638; 610 and 315 individual/m^2, respectively (Table 2). *Melanoides tuberculata* was the most prevalent molluscs found in this reservoir 25 yeaes ago with 32.6 % of Family Thiaridae (Punsri, 1979). The most abundant at station, 1, 2, 3 and 4 was *Melanoides tuberculata* with quantities of 678; 411; 2,865 and 1,063 individual/m^2 but at station 5 was *Wattebledia crosseana* with 94 individual/m^2 (Figure 2, 3). The molluscs were distributed in the highest density between 0.5 and 2.0 meters in depth and some species could be found at the depth of 5.0 and 8.0 meters (Figure 4). This is similar to the recent studies and confirms that the benthic fauna in this reservoir is distributed most densely between 0 and 6.0 meters (Wichai, 1972; Punsri, 1979). Most samples found at greater depths were dead.

4. Quantity variation

There were similar trends in the annual variation at different stations and at different depth. At station 3, 0.5-m depth and station 4, 2.0-m depth the mollusc found rather higher than at any other depths in June (Figure 5).

The quantity variation of total molluscs numbers of this study varied between 7600 and 14000 individuals/m^2. The quantity was noticeably dropped in December. It was suspected that the fishing operation and animal migration were the cause of quantity dropping. *Melanoides tuberculata* was the most dominant species that mainly influenced the total variation. The second and third dominant species were less fluctuated than the first one. However, the trend of all dominant species variation seemed to be in a similar pattern (Figure 6).

The mollusc is a common food for people in the northeastern area. They usually consume *Corbicula* spp., locally called sweet clam. Also some of the Subfamily Rectidentinae and Subfamily Bellamyinae are popular delicacies. Mollusc are natural fish feeding too. There are 4 – 6 main economic fish species that feed on molluscs. Molluscs were about 15 - 26 % of the stomach content of the striped tiger nandid (*Pristolepis fasciatus)* (Sawat, 1981; Santana *et al.* , 1990). It is certain that the mollusc is one of the main ecological components in the food web system.

Table 1 Molluscs community structure, by family, in Ubolratana Reservoir from August 1999 to June 2000.

Month	AUG		OCT		DEC		FEB		MAR		JUN	
family	ind./m^2	%	ind./m^2	%	ind./m^2	%	ind./m^2	%	ind./m^2	%	ind./m^2	%
Bithyniidae	607.3	5.2	711	5.7	1281.4	16.6	1636.9	13.4	696.1	6.4	740.5	5.3
Viviparidae	895.6	7.6	888.4	7.1	688.3	8.9	799.4	6.5	962.2	8.8	1036.6	7.4
Assimieneidae	0.0	0.0	0	0.0	496.2	6.4	548.1	4.5	29.6	0.3	44.4	0.3
Stenothyridae	0.0	0.0	0	0.0	0	0.0	66.6	0.5	14.8	0.1	14.8	0.1
Hydrobiidae	0.0	0.0	0	0.0	0	0.0	14.8	0.1	29.6	0.3	0	0.0
Thiaridae	7473.9	63.8	8976.8	71.6	4073.9	52.9	5932.4	48.4	7258.9	66.4	9622.1	68.6
Buccinidae	399.9	3.4	170.3	1.4	88.8	1.2	125.9	1.0	162.9	1.5	207.3	1.5
Planorbidae	0.0	0.0	14.8	0.1	29.6	0.4	133.4	1.1	0	0.0	0	0.0
Lymnaeidae	0.0	0.0	0	0.0	14.8	0.2	29.6	0.2	14.8	0.1	14.8	0.1
Bulinidae	0.0	0.0	0	0.0	14.8	0.2	0	0.0	0	0.0	0	0.0
Arcidae	88.8	0.8	162.9	1.3	0	0.0	911.1	7.4	59.2	0.5	600.1	4.3
Corbiculidae	1518.3	13.0	1281	10.2	837	10.9	1474	12.0	1080.6	9.9	1185	8.4
Amblemidae	636.8	5.4	288.7	2.3	177.6	2.3	444.1	3.6	547.9	5.0	310.8	2.2
Margaritiferidae	0	0.0	14.8	0.1	0	0.0	29.6	0.2	14.8	0.1	29.6	0.2
Mytilidae	88.8	0.8	37	0.3	0	0.0	103.7	0.8	59.2	0.5	222.3	1.6
Total	11709.4	100.0	12545.7	100.0	7702.4	100.0	12249.6	100.0	10930.6	100.0	14028.3	100.0

Table 2 Fourteen dominant species of mollusc and their quantity by order.

Species code	Scientific name	Quantity
A	*Melanoides tuberculata*	5079
B	*Tarebia granifera*	1809
C	*Wattebledia crosseana*	638
D	*Corbicula bocourti*	610
E	*Thiara scabra*	315
F	*Trochotia trochoides*	305
G	*Scaphula pinna*	303
H	*Filopaludina maekoki*	294
I	*Corbicula. blandiana*	237
J	*Clea helina*	151
K	*Scabies crispata*	186
L	*Scabies phaselus*	130
M	*Wattebledia siamensis*	112
N	*Filopaludina martensi*	110

CONCLUSION

Molluscs were found distributed all over the 5 chosen stations at various depths, and the depth of 2 meters was the most suitable for their living. The annual variation tendency of the dominant species were rather in the similar pattern. Molluscs in 3 subfamilies of Corbiculinae, Rectidentinae and Bellamyinae were popular as delicacies, which were found at the second, third and fourth levels of reservoir depths. They were considered as the main economic fisheries resources for the communities around Ubolratana Reservoir and nearby areas.

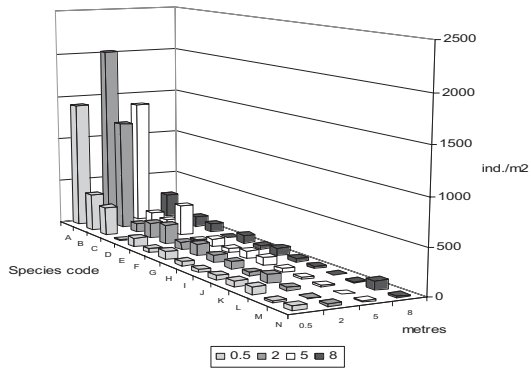

Figure 2 Species distribution at different depths of reservoir.

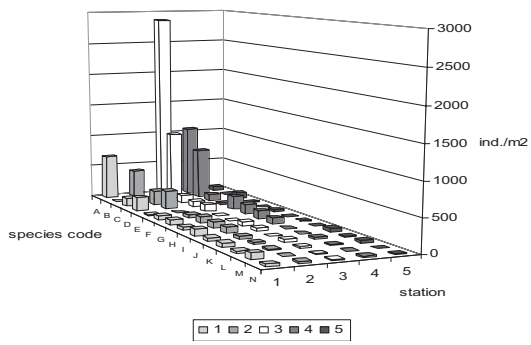

Figure 3 Species distribution at different stations.

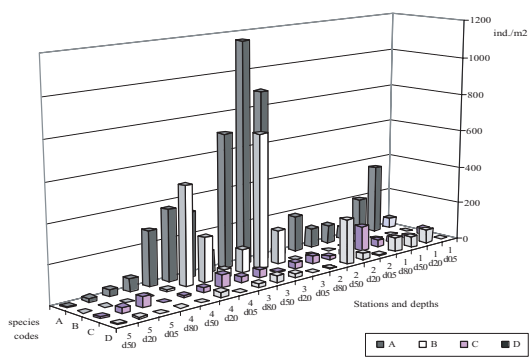

Figure 4 Four dominant species distribution at different stations and depths of reservoirs.

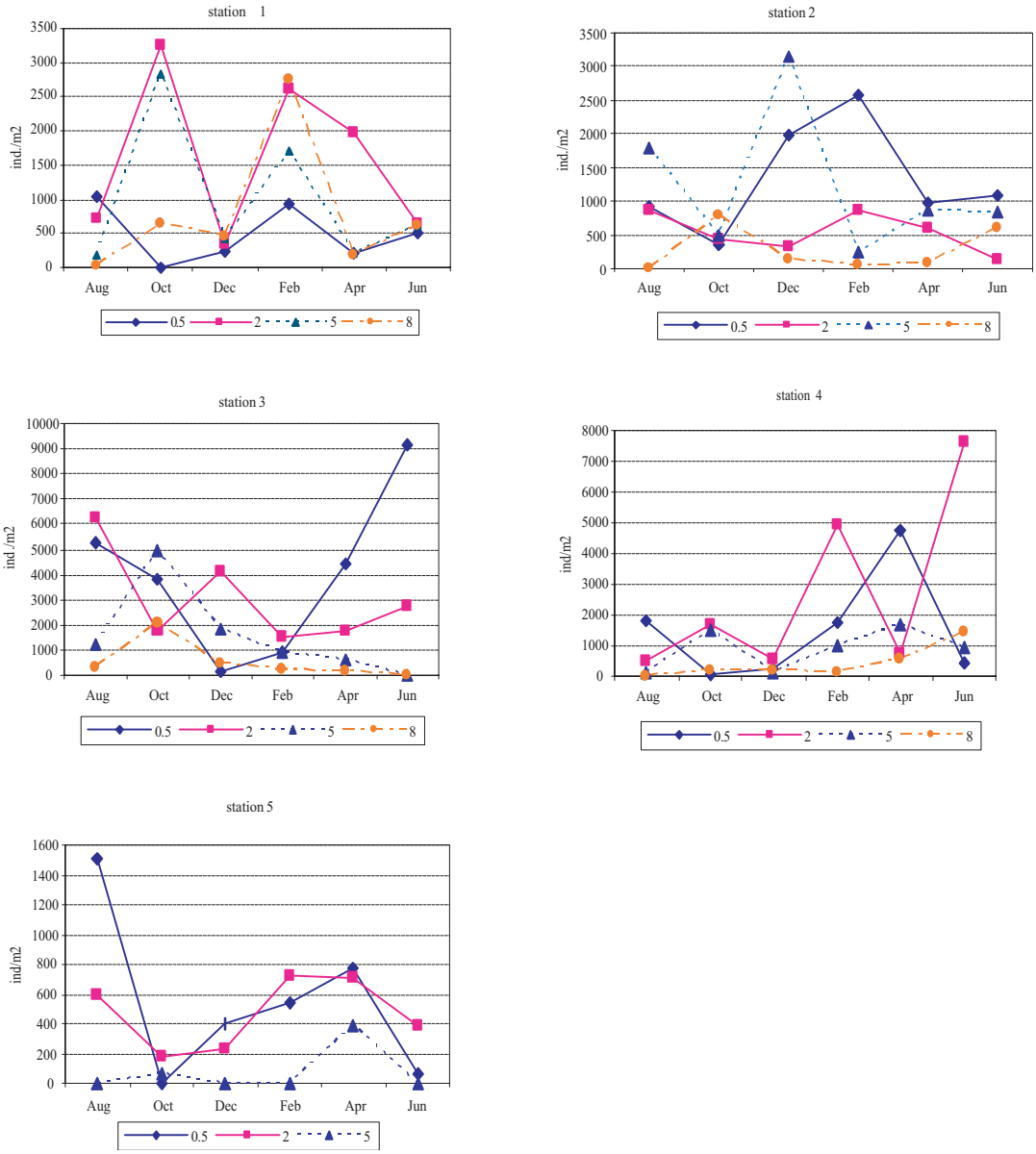

Figure 5 Quantity variation of molluscss at different stations and depths.

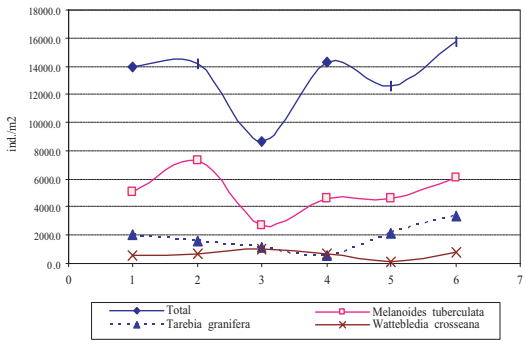

Figure 6 Quantity variation of total mollusc and the top three dominant species.

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