DISTRIBUTION OF RAZOR CLAMS IN THE GULF OF THAILAND

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ABSTRACT

Razor clams comprising the three species *Solen corneus* Lamarck, 1818, *S. strictus* Gould, 1861, and *Solen* sp. (cf. *malaccensis* Dunker, 1862) are distributed along the coastal areas of the western coast of the inner Gulf of Thailand. Average densities were estimated at 16.4 individuals/m^2 in Samutprakarn province (study area 1.97 km^2). In Samutsongkhram province the average density was 17.7 individuals/ m^2 (study area 24.1 km^2) while the average was 19.4 individuals/m^2 (study area 13.5 km^2) in Phetchaburi.

INTRODUCTION

Several economically important molluscs (cockle, short necked clam, green mussel and razor clam) occur along the 159 km stretch of the west coast of the inner Gulf of Thailand (the three provinces Samutprakarn, Samutsongkhram and Phetchaburi). Razor clam is an especially valuable resource for the fishermen in Samutsongkhram province. In Thailand the largest area with abundant razor clam populations is the mouth of Mae Klong River from Kong Prague Lurk to Ban Bang Boh, which is called " Don Hoy Lord. " The total domestic consumption of razor clam was 1,275 metric tons (MT) in 1983. The consumption decreased in 1985, 1986, and 1987 to 395, 299, and 414 MT respectively (Dept. of Fisheries, 1989).

From 1986 to 1988, the marine shrimp culture had caused several problems leading to a degradation of the environment. These problems were related to discharge of water from the shrimp ponds, which had unintended effects on blood cockle, green mussel, and razor clam in the coastal area. Especially, the populations of razor clam decreased drastically (Tuaycharoen & Vora-in 1991). In consequence, the Department of Fisheries initiated research in order to study how to conserve the natural resources and how to increase the populations of razor clam in the inner Gulf of Thailand. The research should identify suitable areas. Regulations should be made to create sustainable utilisation by control of the size of harvested clams.

MATERIALS AND METHODS

Study areas

Samutprakarn: Three coastal areas were selected for survey in Samutprakarn province. The first area was on the right side of Chao Phaya River, about 500 m from the coastline. The second site was on the left side of Chao Phaya River, about 600 m from the coastline. The third area was about 2,100 m from the coastline.

Samutsongkhram: Five study areas were selected at the mouth of the river and in an area along the coast.

Phetchaburi: Two study areas were chosen along the coast in Phetchaburi province.

Each study area was marked with rope and bamboo sticks. The survey occurred between March and May at the lowest low water level (Tide Tables by the Hydrographic Department).

Soil properties

Five soil samples, each about 1 kg, were collected at random within each study area in three provinces. The pH of pore water, the texture based on grain size composition, and the percentage of organic matter were measured in the laboratory following methods of the Department of Soil Science (1976).

Distribution of razor clams
A total of 40, 58, and 36 samples, each 1 m^2, were collected at random in Samutprakarn, Samutsongkhram and Phetchaburi provinces, respectively. The razor clams emerged to the sediment surface after contact with calcium oxide introduced into the siphon holes on the tip of a ca. 20 cm long bamboo stick. Contact was made with the clams at depths of 3-8 cm. Finally the sampling area was tested for clams by digging. The location of each sampling area was mapped.

RESULTS

Quantitative distribution.
In Samutprakarn province, the three areas harbouring razor clams covered 1.97 km^2 (0.42 + 0.72 + 0.83 km^2) of the total intertidal area of about 5.2 km^2.
The survey in Samutsongkhram province showed that razor clams lived in approximately of 24.1 km^2 (8.8 + 4.64 + 1.5 + 8.35 + 0.69 km^2) of the total intertidal of about 35.2 km^2.
In Phetchaburi province, razor clams lived in approximately 13.5 km^2 (4.14 + 9.36 km^2) of the total intertidal of about 41 km^2.

Soil properties
Most of the coastal areas along the upper west coast of the inner gulf of Thailand comprise sandy and muddy sediment in a variety of mixtures. The condition of the soil in the present study areas is shown in Tab. 1,

Table 1. Soil properties in the three subareas at Samutprakran, both inside and outside the razor clam beds.

Samutprakran						
	pH	POM (%)	Sand (%)	Silt (%)	Clay (%)	Type of soil
Area 1 ±sd	6.9±0.08	0.33±0.12	76.59±10.18	11.61±7.23	11.8±9.23	Sandy clay
Area 2±sd	6.9±0.08	0.16±0.02	75.08±2.96	22.72±2.44	2.2±1.67	Clayey sand
Area 3±sd	7.1±0.04	0.13±0.07	92.6±4.24	1.6±1.67	6.2±2.68	Sand
Outside the clam beds	6.98±0.12	0.21±0.11	81.4±10.22	11.9±9.85	6.7±6.61	Clayey sand

Table 2. Soil properties in Samutsongkhram, both inside and outside the razor clam beds.

Samutsongkhram						
	pH	POM (%)	Sand (%)	Silt (%)	Clay (%)	Type of soil
Inside the clam beds	7.5±0.28	0.88±0.83	77.2±15.84	20.1±15.11	2.7±2.77	Clayey sand
Outside the clam beds	7.5±0.28	0.88±0.83	77.2±15.84	20.1±15.11	2.7±2.77	Clayey sand

Table 3. Soil properties in the two subareas in Phetchaburi, both inside and outside the razor clam beds

Phetchaburi						
	pH	POM (%)	Sand (%)	Silt (%)	Clay (%)	Type of soil
Area 1±sd	8.2±0.25	0.33±0.24	63.1±8.2	34.6±8.25	2.3±0.38	Sandy clay
Area 2±sd	8.2±0.23	0.26±0.11	69.5±12.76	28.3±12.56	2.1±0.35	Sandy clay
Outside the clam beds	8.2±0.23	0.3±0.18	66.3±10.65	31.5±10.54	2.3±0.36	Sandy clay

Table 4. Density of razor clams (number per squaremeter) in the three subareas in Samutprakarn province

Samutprakarn	Site 1	Site 2	Site 3
Density (no/m^2 ±sd)	9.6±8.4	18.2±15.3	19.2±12.2

Table 5. Total density of razor clams in each of the three Provinces

	Samutprakarn	Samutsongkhram	Phetchaburi
Density (no/m^2 ± sd)	16.4±13.1	17.7±16.04	19.39±13.01

2 and 3.

Distribution of the razor clams

Razor clams are often found in parts of the coast where the sediment is a mixture of sand and clay, usually close to the mouth of a river. The clams bury to a depth of approximately 30 cm. The siphons protrude to the sediment surface and reveal the location of a razor clam habitat.

Solen corneus was the only species encountered in Samutprakarn province. Three species were recorded in Samutsongkhram province, viz. *Solen strictus*, *Solen corneus* and *Solen* sp. One species occurred in Phetchaburi province; *Solen* sp.

The density ranged from 0-43 individuals/m^2 with an average of 16.4 individuals /m^2 in Samutprakarn province (Tab. 4).

The density ranged from 0-163 individuals/m^2 in Samutsongkhram province while the average was 17.7 individuals/m^2 (Tab. 5). In 1987-1988, the density was 8-145 individuals/m^2 and the average 37.3 individuals/m^2 (Tuaycharoen & Charoenporntip 1995).

The density ranged from 0-69 individuals/m^2 in Phetchaburi province and the average was 19.4 individuals/m^2 (Tab. 5).

Taxonomy of the razor clam

Solen strictus Gould, 1861. The shell is long, thick and narrow, obliquely truncated at the anterior and vertically truncated at the posterior end. The dorsal margin is straight and the surface of the shell is covered with a smooth, polished and yellowish periostracum. Shell length 6-8 cm long. (Tadashige 1977)

Solen corneus Lamarck, 1818. The shell is long and wide, the surface of the shell is covered with smooth, polished, thin, yellowish periostracum. Shell length 6-10 cm long. (Dance 1990)

Solen sp. (cf. *malaccensis* Dunker, 1862). The shell is narrow. It is 3-5 cm long and easily broken. The surface of the shell is smooth, thin, and polished. The colour of the shell is creamy with yellowish tint. The anterior part constricted and with exterior furrow. (Dr. R.N. Kilburn named the species *Solen malaccensis* Dunker, 1862 but Dr. Rudo von Cosal preferred to call it *Solen* sp.

DISCUSSION

The soil of Samutprakarn and Samutsongkhram had similar texture (clayey sand) while the study area in Phetchaburi province was more sandy (sandy clay).

Tuaycharoen & Vora (1991) reported that the soil at Ban Bang Boo, Samutsongkhram province was composed of sand, silt, and clay at an average of 35, 37 and 28 % respectively. The soil pH was neutral or slightly basic with an average ranging from 7.6 - 8.1. The amount of organic matter was 0.44 - 4.33 %. Tuaycharoen & Charoenporntip (1995) studied the same area in 1992-1994 and found that the soil was more sandy compared to the present study. The average density of razor clam had decreased since it was estimated during a study in 1987-1988 (Tuaycharoen & Vora 1991). They found a high average density of razor clams (37.3 individuals/m^2), compared to an average of

17.8 individuals/m^2 estimated during the present study.

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