

CHAPTER II
MATERIALS AND METHODS

Materials examined

Most of the studied specimens of leiognathids and gerreids were personally collected, during November 1988 to November 1990, from various fish landings, fish ports, fish villages, markets, and directly from some fishing grounds along the coasts of the Gulf of Thailand and of the Andaman Sea (Fig. 1). The others are preserved specimens in custody of major institutions in Thailand, their names are abbreviated as follows :

- CUMNH** Chulalongkorn University Museum of Natural History.
KUMF Kasetsart University Museum of Fisheries, Bangkok.
MFL Marine Fisheries Laboratory, Fish collection, Bangkok.
MSD-CU Marine Science Department, Chulalongkorn University, Bangkok.
NICA National Institution of coastal Aquaculture, Fish collection, Songkla.
PMBC Phuket Marine Biological Centre, Phuket.

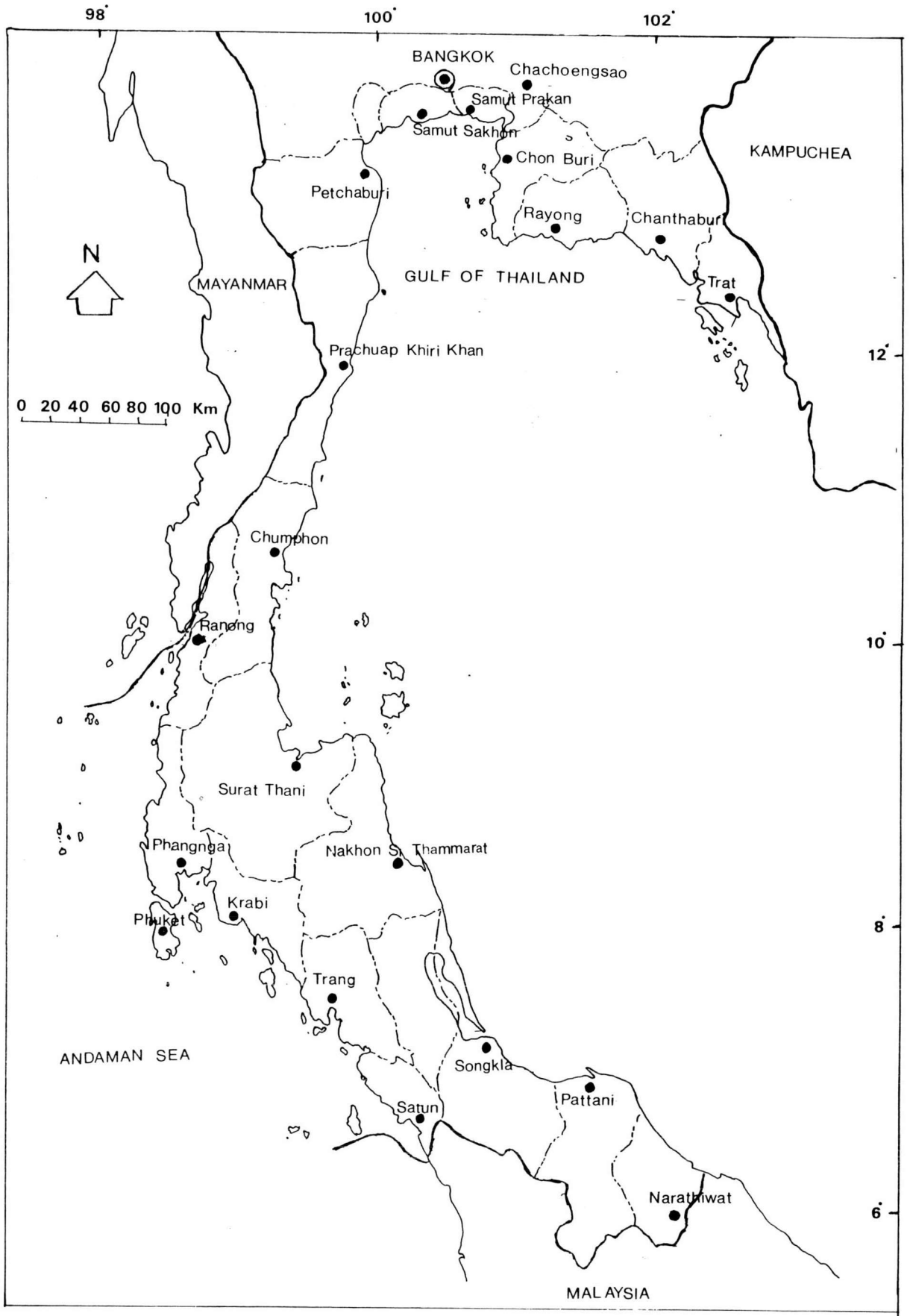


Fig. 1 Map showing location (indicated by the name of provinces) where fresh studied specimens and field data were collected (modified from the map of the Department of Highways, 1982)

Preparation and Preservation of Specimens.

Specimens or series of specimens which were personally collected for this study were carefully preserved in 5-10 % of formalin by spreading their fins, after cleaning with tap water or sea water. The field data, for example, place of collection or capture, fishing gear, date of collection and any other related useful data were placed together with each lots of the specimens, lot by lot. Only some fresh specimens of each species of the studied groups were particularly prepared for taking several photographs to record the color pattern in supplementation to their notes on the coloration. They were brought back to the Department of Marine Science, Faculty of Science, Chulalongkorn University for taxonomic detailed study.

The formalin preserved specimens were kept at least 2 days before soaking in tap water for 2 days and then transferred to preserve permanently in 70 % of ethyl alcohol. These specimens from the field had been therefore ready for study, and they have been kept at the collection of the Department of Marine Science, Chulalongkorn University.

Measurements and Counts

For the present work, morphometric and meristic data of each species had been taken from available specimens of various size ranges whenever possible from different collected location. Any unreliable part of the fishes which was subjected to abnormality or damage was omitted from measurements or counts. Procedures used for measurements and counts are based largely on those used by Hubbs and Lagler (1962) with some modifications and additions.

Measurements

All measurements (Fig. 2) were straight-line distance, normally taken from the left side of the specimens, by using divider spreaded from point to point. With a standard ruler, they were read and recorded to one-tenth of a millimeter, and being later proportionally expressed or calculated to the percentage of the standard length or head length, or body depth, or any other (if any is required), of that specimen.

1. **Standard length** : snout tip to posterior edge of hypural plate, or practically the flexure line anterior to the caudal fin base.
2. **Total length** : snout tip to posterior tip of upper caudal lobe.

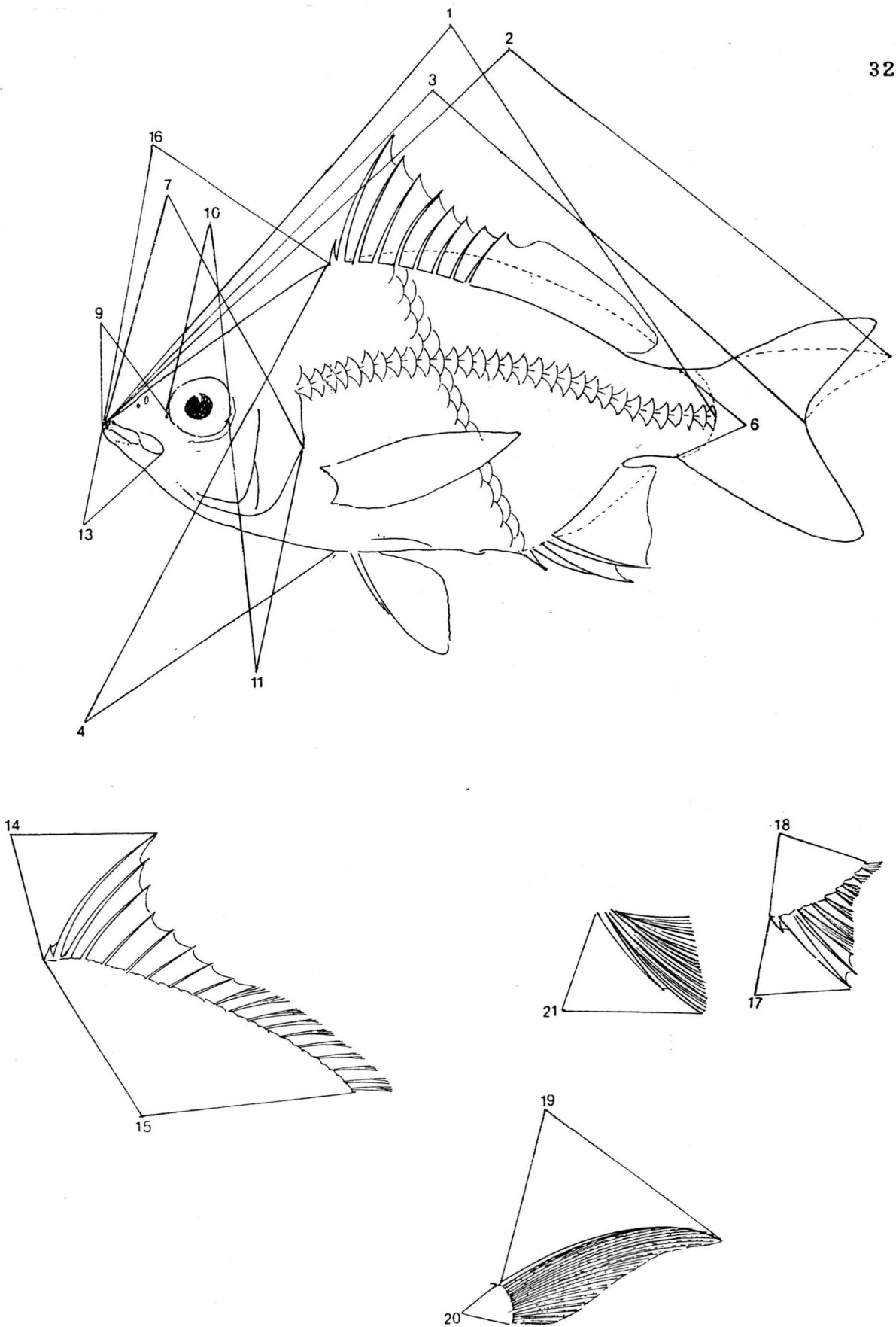


Fig. 2 Measurements variously used for recording and describing (see pp. 31-35)

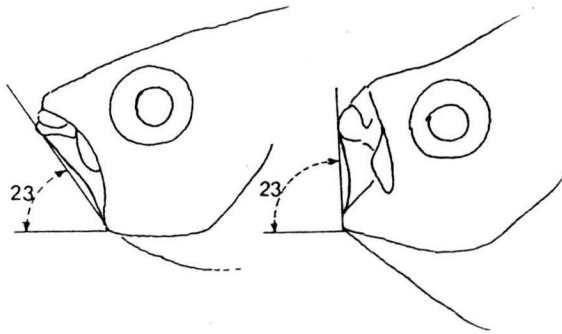
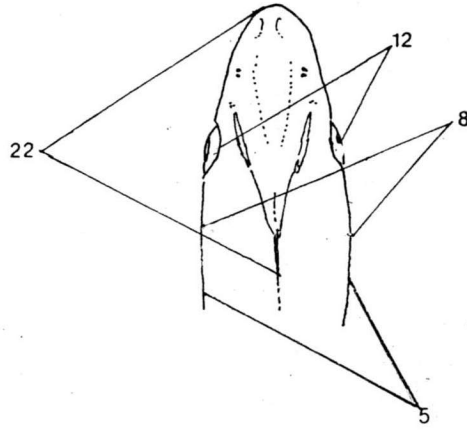


Fig. 2 (continued). Measurements variously used for recording and describing (see pp. 31-35)

Notes No. 22 and 23, measurements used for leiognathids only

3. Fork length : snout tip to posterior tip of shortest middle caudal ray.
4. Body depth : vertical distance from origin of dorsal fin to ventral profile.
5. Body width : greatest width of body, usually taken just behind humeral region.
6. Depth of caudal peduncle : least depth of caudal peduncle.
7. Head length : snout tip to posterior edge of opercular flap.
8. Head width : greatest width between both sides of operculum.
9. Snout length : snout tip to anterior border of eye.
10. Eye diameter : horizontal diameter of eye.
11. Postorbital distance : posterior border of eye to posterior edge of opercular flap.
12. Interorbital width : distance of narrowest part between eyes.
13. Upper jaw (maxilla) length : snout tip to posterior end of maxilla.
14. Height of dorsal fin : distance from origin of dorsal fin to tip of longest anterior ray.
15. Dorsal fin base : distance from origin of first dorsal fin ray to base of last ray.
16. Predorsal fin length : snout tip to origin of first dorsal fin ray.
17. Height of anal fin : distance from origin of anal fin to tip of longest anterior ray.

18. Anal fin base : distance from origin of first anal fin ray to posterior base of last ray.
19. Length of pectoral fin : from origin of upper pectoral fin ray to tip of longest ray.
20. Pectoral fin base : widest distance of pectoral region.
21. Length of pelvic fin : from origin of first pelvic ray to tip of longest ray.
22. Length of nuchal spine : totally measured from snout tip to the end of nuchal crest.
23. Angle of lower jaw : angle between lines of the lower edge of lower jaw when mouth closed and the horizontal line of body.

Counts

Fin ray counts of all fins, but only left side for the paired fins were taken right from the preserved specimens, records of the number of fin rays are as follows: spiny (unsegmented) rays are indicated by Roman numerals, and soft (segmented) rays whether branched or unbranched are counted together and are indicated by Arabic numerals. A comma is used to separate the number of spiny rays from the soft rays in the same fin. Caudal fin ray counts are the count of total branched rays plus one simple ray above and another one below. The last two dorsal and anal fin rays are often united at their

bases, they are counted as a single element.

Gill raker count is record of rakers on the first gill arch, for each species, they are expressed in the form : upper gill raker range + lower gill raker range = total range. A gill raker on the angle of the arch between the upper and lower limbs is included in the lower raker counts. Rudimentary gill rakers are included in the counts.

Scale counts are made for both transverse scale series and tubed scales on the lateral line. Transverse scale count is the number of longitudinal rows between base of the 5th dorsal spiny fin ray and the origin of the anal fin. This count is made possible only for gerreids, and not for leiognathids, this is according to the uncountable minute size of the scales of the latter. Tubed scales on the lateral line are those scales in the lateral line that bear tubed. In the case of scales had fallen off or deciduous scales, the scale pockets of tubed scales or sensory pores at the sites have counted instead.

Presentation

The presentation of this study which appeared in Chapter III comprises texts, graphs and tables, figures or the line drawings of the fishes. The detailed information within the text combined that of dichotomous key to

family and key to genera and species, they are incorporated with illustrations for better understanding.

In the family descriptions, the author follows the works of James (1975), FAO (1984), Nelson (1984) and Jones (1985), mainly. However, they are modified with some findings of the author.

At the generic levels, those descriptions of Leiognathidae are given firstly and followed by those of Gerreidae, they are orderly arranged as follows: *Gazza*, *Leiognathus*, *Secutor*, *Gerres* and *Pentaprion*, but at the species levels, species by species are arranged in alphabetic manner. Each species is provided with the valid scientific name firstly, and followed by figures and tables, all in bracket ; and the followings are common names, synonyms, materials examined, diagnosis and remarks.

All available Thai and English names which have been used in literatures are cited under heading of common names. Any Thai name which is differently called upon for any studied species is also given.

Synonyms are selectively collected from up-to-date revisions, only the primary synonym is listed with reference to its original publication.

In the part of materials examined the catalogued number of each lot of specimen(s) is given but alphabetically arranged according to institutional abbreviations (where the specimens are deposited). This is followed by number of specimens of that lot, their size ranges in mmS.L., location, date of collection, and collector(s).

Distinctive features are given for diagnosis of each species, however, the accompanied graphs, tables and figures are prepared as an aid to identify or recognize the species. The detail of the diagnosis usually included: body and fin proportions, structural morphology and distinctive coloration and possibly also other interesting characters.

Taxonomic matters or other problems are discussed in remarks, e.g., comparative data, status of species and some valuable information.

